

# SEQUENCE LISTING

<110> Korneluk, Robert G.  
 MacKenzie, Alexander E.  
 Baird, Stephen  
 Liston, Peter

<120> MAMMALIAN IAP GENE FAMILY, PRIMERS,  
 PROBES, AND DETECTION METHODS

<130> 07891/003006

<150> US 09/011,356  
 <151> 1998-02-04

<150> PCT/IB96/01022  
 <151> 1996-08-05

<150> US 08/576,956  
 <151> 1995-12-22

<150> US 08/511,485  
 <151> 1995-08-04

<160> 45

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 <223> Synthetic based on Homo sapiens, Mus musculus,  
 Drosophila melanogaster, Cydia pomonella, and  
 Orgyia pseudotsugata

<221> VARIANT  
 <222> (2)...(45)  
 <223> Xaa at positions 2, 3, 4, 5, 6, 7, 9, 10, 11, 17,  
 18, 19, 20, 21, 23, 25, 30, 31, 32, 34, 35, 38,  
 39, 40, 41, 42, and 45 may be any amino acid.

<221> VARIANT  
 <222> (8)...(8)  
 <223> Xaa at position 8 is Glu or Asp.

<221> VARIANT  
 <222> (14)...(14)  
 <223> Xaa at position 14 is Val or Ile.

<221> VARIANT  
 <222> (22)...(22)  
 <223> Xaa at position 22 is Val or Ile.

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 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Phe Xaa Pro Cys Gly His Xaa Xaa Xaa  
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<220>  
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 19, 20, 21, 24, 30, 32, 33, 35, 37, 40, 42, 43,  
 44, 45, 46, 47, 49, 50, 51, 53, 54, 55, 56, 57,  
 59, 60, 61, 62, 64 and 66 may be any amino acid.

<221> VARIANT  
 <222> (13)...(17)  
 <223> Xaa at positions 13, 16 and 17 may be any amino  
 acid or may be absent.

<223> Synthetic based on Homo sapiens, Mus musculus,  
 Drosophila melanogaster, Cydia pomonella, and  
 Orgyia pseudotsugata

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 20 25 30  
 Xaa Asp Xaa Val Xaa Cys Phe Xaa Cys Xaa Xaa Xaa Xaa Xaa Xaa Trp  
 35 40 45  
 Xaa Xaa Xaa Asp Xaa Xaa Xaa Xaa His Xaa Xaa Xaa Xaa Pro Xaa  
 50 55 60  
 Cys Xaa Phe Val  
 65

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 <212> DNA  
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<220>  
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 <222> (2540)...(2540)  
 <223> N may be any nucleotide

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 ttaaaaactt ttgctaattt tccaagtggt agtctgttt cagcatcaac actggcacga 180  
 gcagggtttc ttatactgg tgaaggagat accgtgcggt gctttagttg tcatgcagct 240  
 gtatatagat ggcaatatgg agactcagca gttggaagac acaggaaagt atccccaaat 300

|             |             |             |            |             |             |      |
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| tgcagattta  | tcaacggctt  | ttatcttgaa  | aatagtgcc  | cgcagtctac  | aaattctggt  | 360  |
| atccagaatg  | gtcagtagaa  | agttgaaaac  | tatctgggaa | gcagagatca  | ttttgcctta  | 420  |
| gacaggccat  | ctgagacaca  | tgcagactat  | cttttgagaa | ctgggcaggt  | tgtagatata  | 480  |
| tcagacacca  | tatacccgag  | gaaccctgcc  | atgtattgtg | aagaagctag  | attaaagtcc  | 540  |
| tttcagaact  | ggccagacta  | tgctcaccta  | accccaagag | agtttagcaag | tgctggactc  | 600  |
| tactacacag  | gtattggtga  | ccaagtgcag  | tgcttttgtt | gtggtggaaa  | actgaaaaat  | 660  |
| tggaacacct  | gtgatcgtgc  | ctggtcagaa  | cacaggcgac | actttcctaa  | ttgcttcttt  | 720  |
| gttttgggcc  | ggaatcttaa  | tattcgaagt  | gaatctgatg | ctgtgagttc  | tgataggaat  | 780  |
| ttcccaaat   | caacaaatct  | tccaagaaat  | ccatccatgg | cagattatga  | agcacggatc  | 840  |
| tttacttttg  | ggacatggat  | atactcagtt  | aacaaggagc | agcttgcaag  | agctggattt  | 900  |
| tatgcttttag | gtgaagggtga | taaagtaaag  | tgcttttact | gtggaggagg  | gctaactgat  | 960  |
| tggaagccca  | gtgaagaccc  | ttgggaacaa  | catgctaaat | ggtatccagg  | gtgcaaatat  | 1020 |
| ctgttagaac  | agaagggaca  | agaatatata  | aacaatattc | atttaactca  | ttcacttgag  | 1080 |
| gagtgtctgg  | taagaactac  | tgagaaaaca  | ccatcactaa | ctagaagaat  | tgatgatacc  | 1140 |
| atcttccaaa  | atcctatggt  | acaagaagct  | atacgaatgg | ggttcagttt  | caaggacatt  | 1200 |
| aagaaaataa  | tgagggaaaa  | aattcagata  | tctgggagca | actataaatc  | acttgagggt  | 1260 |
| ctgggtgcag  | atctagtga   | tgctcagaaa  | gacagtatgc | aagatgagtc  | aagtcagact  | 1320 |
| tcattacaga  | aagagattag  | tactgaagag  | cagctaaggc | gcctgcaaga  | ggagaagctt  | 1380 |
| tgcaaaatct  | gtatggatag  | aaatattgct  | atcgtttttg | ttccttgtgg  | acatctagtc  | 1440 |
| acttgtaaac  | aatgtgctga  | agcagttgac  | aagtgtccca | tgtgctacac  | agtcattact  | 1500 |
| ttcaagcaaa  | aaatttttat  | gtcttaatct  | aactctatag | taggcatggt  | atgttgttct  | 1560 |
| tattaccctg  | attgaatgtg  | tgatgtgaac  | tgactttaag | taatcaggat  | tgaattccat  | 1620 |
| tagcatttgc  | taccaagtag  | gaaaaaaaaat | gtacatggca | gtgttttagt  | tggaatatata | 1680 |
| atctttgaat  | ttcttgattt  | ttcagggtat  | tagctgtatt | atccattttt  | tttactgtta  | 1740 |
| tttaattgaa  | accatagact  | agaataaaga  | agcatcatac | tataactgaa  | cacaatgtgt  | 1800 |
| attcatagta  | tactgattta  | atttctaagt  | gtaagtgaat | taatcatctg  | gattttttat  | 1860 |
| tcttttcaga  | taggcttaac  | aaatggagct  | ttctgtatat | aaatgtggag  | attagagtta  | 1920 |
| atctccccaa  | tcacataatt  | tgttttgtgt  | gaaaaaggaa | taaattgttc  | catgctgggtg | 1980 |
| gaaagataga  | gattgttttt  | agaggttggt  | tgttgtgttt | taggattctg  | tccattttct  | 2040 |
| tgtaaaaggga | taaacacgga  | cgtgtgcgaa  | atatgtttgt | aaagtgattt  | gccattgttg  | 2100 |
| aaagcgtatt  | taatgataga  | atactatcga  | gccaacatgt | actgacatgg  | aaagatgtca  | 2160 |
| gagatatgtt  | aagtgtaaaa  | tgcaagtggc  | gggacactat | gtatagtctg  | agccagatca  | 2220 |
| aagtatgtat  | gttggttaata | tgcatagaac  | gagagatttg | gaaagatata  | caccaaactg  | 2280 |
| ttaaatgtgg  | tttctcttcg  | gggagggggg  | gattggggga | ggggccccag  | aggggtttta  | 2340 |
| gaggggcctt  | ttcacttttcg | acttttttca  | ttttgttctg | ttcggatttt  | ttataagtat  | 2400 |
| gtagaccccg  | aagggttttta | tgggaaactaa | catcagtaac | ctaaccocccg | tgactatcct  | 2460 |
| gtgctcttcc  | tagggagctg  | tggtgtttcc  | cacccaccac | ccttcocctct | gaacaaatgc  | 2520 |
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 <212> PRT  
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 Phe Ala Asn Phe Pro Ser Gly Ser Pro Val Ser Ala Ser Thr Leu Ala  
 35 40 45  
 Arg Ala Gly Phe Leu Tyr Thr Gly Glu Gly Asp Thr Val Arg Cys Phe  
 50 55 60  
 Ser Cys His Ala Ala Val Asp Arg Trp Gln Tyr Gly Asp Ser Ala Val  
 65 70 75 80  
 Gly Arg His Arg Lys Val Ser Pro Asn Cys Arg Phe Ile Asn Gly Phe  
 85 90 95  
 Tyr Leu Glu Asn Ser Ala Thr Gln Ser Thr Asn Ser Gly Ile Gln Asn  
 100 105 110

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |  |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| Gly | Gln | Tyr | Lys | Val | Glu | Asn | Tyr | Leu | Gly | Ser | Arg | Asp | His | Phe | Ala |  |
|     |     | 115 |     |     |     |     | 120 |     |     |     |     | 125 |     |     |     |  |
| Leu | Asp | Arg | Pro | Ser | Glu | Thr | His | Ala | Asp | Tyr | Leu | Leu | Arg | Thr | Gly |  |
|     | 130 |     |     |     |     | 135 |     |     |     |     | 140 |     |     |     |     |  |
| Gln | Val | Val | Asp | Ile | Ser | Asp | Thr | Ile | Tyr | Pro | Arg | Asn | Pro | Ala | Met |  |
| 145 |     |     |     |     | 150 |     |     |     |     | 155 |     |     |     |     | 160 |  |
| Tyr | Cys | Glu | Glu | Ala | Arg | Leu | Lys | Ser | Phe | Gln | Asn | Trp | Pro | Asp | Tyr |  |
|     |     |     |     | 165 |     |     |     |     | 170 |     |     |     |     |     | 175 |  |
| Ala | His | Leu | Thr | Pro | Arg | Glu | Leu | Ala | Ser | Ala | Gly | Leu | Tyr | Tyr | Thr |  |
|     |     |     | 180 |     |     |     |     | 185 |     |     |     |     | 190 |     |     |  |
| Gly | Ile | Gly | Asp | Gln | Val | Gln | Cys | Phe | Cys | Cys | Gly | Gly | Lys | Leu | Lys |  |
|     | 195 |     |     |     |     |     | 200 |     |     |     |     | 205 |     |     |     |  |
| Asn | Trp | Glu | Pro | Cys | Asp | Arg | Ala | Trp | Ser | Glu | His | Arg | Arg | His | Phe |  |
|     | 210 |     |     |     |     | 215 |     |     |     |     | 220 |     |     |     |     |  |
| Pro | Asn | Cys | Phe | Phe | Val | Leu | Gly | Arg | Asn | Leu | Asn | Ile | Arg | Ser | Glu |  |
| 225 |     |     |     |     | 230 |     |     |     |     | 235 |     |     |     |     | 240 |  |
| Ser | Asp | Ala | Val | Ser | Ser | Asp | Arg | Asn | Phe | Pro | Asn | Ser | Thr | Asn | Leu |  |
|     |     |     |     | 245 |     |     |     |     | 250 |     |     |     |     | 255 |     |  |
| Pro | Arg | Asn | Pro | Ser | Met | Ala | Asp | Tyr | Glu | Ala | Arg | Ile | Phe | Thr | Phe |  |
|     |     |     | 260 |     |     |     |     | 265 |     |     |     |     | 270 |     |     |  |
| Gly | Thr | Trp | Ile | Tyr | Ser | Val | Asn | Lys | Glu | Gln | Leu | Ala | Arg | Ala | Gly |  |
|     |     | 275 |     |     |     |     | 280 |     |     |     |     | 285 |     |     |     |  |
| Phe | Tyr | Ala | Leu | Gly | Glu | Gly | Asp | Lys | Val | Lys | Cys | Phe | His | Cys | Gly |  |
|     | 290 |     |     |     |     | 295 |     |     |     |     | 300 |     |     |     |     |  |
| Gly | Gly | Leu | Thr | Asp | Trp | Lys | Pro | Ser | Glu | Asp | Pro | Trp | Glu | Gln | His |  |
| 305 |     |     |     |     | 310 |     |     |     |     | 315 |     |     |     |     | 320 |  |
| Ala | Lys | Trp | Tyr | Pro | Gly | Cys | Lys | Tyr | Leu | Leu | Glu | Gln | Lys | Gly | Gln |  |
|     |     |     |     | 325 |     |     |     |     | 330 |     |     |     |     | 335 |     |  |
| Glu | Tyr | Ile | Asn | Asn | Ile | His | Leu | Thr | His | Ser | Leu | Glu | Glu | Cys | Leu |  |
|     |     |     | 340 |     |     |     |     | 345 |     |     |     |     | 350 |     |     |  |
| Val | Arg | Thr | Thr | Glu | Lys | Thr | Pro | Ser | Leu | Thr | Arg | Arg | Ile | Asp | Asp |  |
|     |     | 355 |     |     |     |     | 360 |     |     |     |     | 365 |     |     |     |  |
| Thr | Ile | Phe | Gln | Asn | Pro | Met | Val | Gln | Glu | Ala | Ile | Arg | Met | Gly | Phe |  |
|     | 370 |     |     |     |     | 375 |     |     |     |     | 380 |     |     |     |     |  |
| Ser | Phe | Lys | Asp | Ile | Lys | Lys | Ile | Met | Glu | Glu | Lys | Ile | Gln | Ile | Ser |  |
| 385 |     |     |     |     | 390 |     |     |     |     | 395 |     |     |     |     | 400 |  |
| Gly | Ser | Asn | Tyr | Lys | Ser | Leu | Glu | Val | Leu | Val | Ala | Asp | Leu | Val | Asn |  |
|     |     |     |     | 405 |     |     |     |     | 410 |     |     |     |     | 415 |     |  |
| Ala | Gln | Lys | Asp | Ser | Met | Gln | Asp | Glu | Ser | Ser | Gln | Thr | Ser | Leu | Gln |  |
|     |     |     | 420 |     |     |     |     | 425 |     |     |     |     | 430 |     |     |  |
| Lys | Glu | Ile | Ser | Thr | Glu | Glu | Gln | Leu | Arg | Arg | Leu | Gln | Glu | Glu | Lys |  |
|     |     | 435 |     |     |     |     | 440 |     |     |     |     | 445 |     |     |     |  |
| Leu | Cys | Lys | Ile | Cys | Met | Asp | Arg | Asn | Ile | Ala | Ile | Val | Phe | Val | Pro |  |
|     | 450 |     |     |     |     | 455 |     |     |     |     | 460 |     |     |     |     |  |
| Cys | Gly | His | Leu | Val | Thr | Cys | Lys | Gln | Cys | Ala | Glu | Ala | Val | Asp | Lys |  |
| 465 |     |     |     |     | 470 |     |     |     |     | 475 |     |     |     |     | 480 |  |
| Cys | Pro | Met | Cys | Tyr | Thr | Val | Ile | Thr | Phe | Lys | Gln | Lys | Ile | Phe | Met |  |
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| aatggaaata  | atggaaatth  | ttcatttttg  | cttttcagcc  | tagtattaaa | actgataaaa  | 120  |
| gcaaagccat  | gcacaaaact  | acctccctag  | agaaaggcta  | gtcccttttc | ttccccattc  | 180  |
| atttcattat  | gaacatagta  | gaaaacagca  | tattcttata  | aaatttgatg | aaaagcgcca  | 240  |
| acacgtttga  | actgaaatac  | gacttgtcat  | gtgaactgta  | ccgaatgtct | acgtattcca  | 300  |
| cttttcctgc  | tggggttcct  | gtctcagaaa  | ggagtcttgc  | tcgtgctggg | ttctattaca  | 360  |
| ctgggtgtaa  | tgacaaggtc  | aaatgcttct  | gttgtggcct  | gatgctggat | aactggaaaa  | 420  |
| gaggagacag  | tcctactgaa  | aagcataaaa  | agttgtatcc  | tagctgcaga | ttcgttcaga  | 480  |
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| cacattccac  | acactcatta  | cttccgggta  | cagaaaacag  | tggatatttc | cgtggctctt  | 600  |
| attcaaaact  | tccatcaaat  | cctgtaaaact | ccagagcaaa  | tcaagaattt | tctgccttga  | 660  |
| tgagaagttc  | ctaccctgt   | ccaatgaata  | acgaaaatgc  | cagattactt | acttttcaga  | 720  |
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| gacctggaga  | cagagtggct  | tgctttgcct  | gtgggtgaaa  | attgagcaat | tggaaccga   | 840  |
| aggataatgc  | tatgtcagaa  | cacctgagac  | attttcccaa  | atgccattt  | atagaaaatc  | 900  |
| agcttcaaga  | cacttcaaga  | tacacagttt  | ctaactctgag | catgcagaca | catgcagccc  | 960  |
| gctttaaaac  | attctttaac  | tggccctcta  | gtgttctagt  | taatcctgag | cagcttgcaa  | 1020 |
| gtgcgggttt  | ttattatgtg  | ggtaacagtg  | atgatgtcaa  | atgcttttgc | tgtgatgggtg | 1080 |
| gactcaggtg  | ttgggaatct  | ggagatgatc  | catgggttca  | acatgccaa  | tggtttccaa  | 1140 |
| gggtgtgagta | cttgataaga  | attaaaggac  | aggagtccat  | ccgtcaagtt | caagccagtt  | 1200 |
| accctcatct  | acttgaacag  | ctgctatcca  | catcagacag  | cccaggagat | gaaaatgcag  | 1260 |
| agtcatcaat  | tatccatttg  | gaacctggag  | aagaccattc  | agaagatgca | atcatgatga  | 1320 |
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| aaaaagaatc  | aaatgattta  | ttattaatcc  | ggaagaatag  | aatggcactt | tttcaacatt  | 1560 |
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| aagtgtgtat  | ggacaaagaa  | gtgtccatag  | tgtttattec  | ttgtggtcat | ctagtagtat  | 1920 |
| gcaaagattg  | tgctccttct  | ttaagaaagt  | gtcctatttg  | taggagtaca | atcaagggtg  | 1980 |
| cagttcgtac  | atttctttca  | tgaagaagaa  | ccaaaacatc  | gtctaaactt | tagaattaat  | 2040 |
| ttattaaatg  | tattataact  | ttaactttta  | tcctaatttg  | gtttccttaa | aatttttatt  | 2100 |
| tattttacaac | tcaaaaaaca  | ttgttttgtg  | taacatatatt | atatatgtat | ctaaaccata  | 2160 |
| tgaacatata  | tttttttagaa | actaagagaa  | tgataggctt  | ttgttcttat | gaacgaaaaa  | 2220 |
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| aagtaaaact  | taagatattt  | gagttaacct  | ttaagaattt  | taaatatatt | ggcattgtac  | 2340 |
| taataccggg  | aacatgaagc  | caggtgtggg  | ggtatgtacc  | tgtagtccca | ggctgaggca  | 2400 |
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| cagtgtccta  | tacatcgaag  | gtgtgcatat  | atgttgaatc  | acatttttag | gacatgggtg  | 2580 |

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 Met Ser Thr Tyr Ser Thr Phe Pro Ala Gly Val Pro Val Ser Glu Arg  
 35 40 45  
 Ser Leu Ala Arg Ala Gly Phe Tyr Tyr Thr Gly Val Asn Asp Lys Val  
 50 55 60  
 Lys Cys Phe Cys Cys Gly Leu Met Leu Asp Asn Trp Lys Arg Gly Asp  
 65 70 75 80  
 Ser Pro Thr Glu Lys His Lys Lys Leu Tyr Pro Ser Cys Arg Phe Val  
 85 90 95  
 Gln Ser Leu Asn Ser Val Asn Asn Leu Glu Ala Thr Ser Gln Pro Thr  
 100 105 110  
 Phe Pro Ser Ser Val Thr His Ser Thr His Ser Leu Leu Pro Gly Thr  
 115 120 125  
 Glu Asn Ser Gly Tyr Phe Arg Gly Ser Tyr Ser Asn Ser Pro Ser Asn  
 130 135 140  
 Pro Val Asn Ser Arg Ala Asn Gln Glu Phe Ser Ala Leu Met Arg Ser  
 145 150 155 160  
 Ser Tyr Pro Cys Pro Met Asn Asn Glu Asn Ala Arg Leu Leu Thr Phe  
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 Gln Thr Trp Pro Leu Thr Phe Leu Ser Pro Thr Asp Leu Ala Arg Ala  
 180 185 190  
 Gly Phe Tyr Tyr Ile Gly Pro Gly Asp Arg Val Ala Cys Phe Ala Cys  
 195 200 205  
 Gly Gly Lys Leu Ser Asn Trp Glu Pro Lys Asp Asn Ala Met Ser Glu  
 210 215 220  
 His Leu Arg His Phe Pro Lys Cys Pro Phe Ile Glu Asn Gln Leu Gln  
 225 230 235 240  
 Asp Thr Ser Arg Tyr Thr Val Ser Asn Leu Ser Met Gln Thr His Ala  
 245 250 255  
 Ala Arg Phe Lys Thr Phe Phe Asn Trp Pro Ser Ser Val Leu Val Asn  
 260 265 270  
 Pro Glu Gln Leu Ala Ser Ala Gly Phe Tyr Tyr Val Gly Asn Ser Asp  
 275 280 285  
 Asp Val Lys Cys Phe Cys Cys Asp Gly Gly Leu Arg Cys Trp Glu Ser  
 290 295 300  
 Gly Asp Asp Pro Trp Val Gln His Ala Lys Trp Phe Pro Arg Cys Glu  
 305 310 315 320  
 Tyr Leu Ile Arg Ile Lys Gly Gln Glu Phe Ile Arg Gln Val Gln Ala  
 325 330 335  
 Ser Tyr Pro His Leu Leu Glu Gln Leu Leu Ser Thr Ser Asp Ser Pro  
 340 345 350  
 Gly Asp Glu Asn Ala Glu Ser Ser Ile Ile His Leu Glu Pro Gly Glu  
 355 360 365  
 Asp His Ser Glu Asp Ala Ile Met Met Asn Thr Pro Val Ile Asn Ala  
 370 375 380  
 Ala Val Glu Met Gly Phe Ser Arg Ser Leu Val Lys Gln Thr Val Gln  
 385 390 395 400

Arg Lys Ile Leu Ala Thr Gly Glu Asn Tyr Arg Leu Val Asn Asp Leu  
 405 410 415  
 Val Leu Asp Leu Leu Asn Ala Glu Asp Glu Ile Arg Glu Glu Glu Arg  
 420 425 430  
 Glu Arg Ala Thr Glu Glu Lys Glu Ser Asn Asp Leu Leu Leu Ile Arg  
 435 440 445  
 Lys Asn Arg Met Ala Leu Phe Gln His Leu Thr Cys Val Ile Pro Ile  
 450 455 460  
 Leu Asp Ser Leu Leu Thr Ala Gly Ile Ile Asn Glu Gln Glu His Asp  
 465 470 475 480  
 Val Ile Lys Gln Lys Thr Gln Thr Ser Leu Gln Ala Arg Glu Leu Ile  
 485 490 495  
 Asp Thr Ile Leu Val Lys Gly Asn Ile Ala Ala Thr Val Phe Arg Asn  
 500 505 510  
 Ser Leu Gln Glu Ala Glu Ala Val Leu Tyr Glu His Leu Phe Val Gln  
 515 520 525  
 Gln Asp Ile Lys Tyr Ile Pro Thr Glu Asp Val Ser Asp Leu Pro Val  
 530 535 540  
 Glu Glu Gln Leu Arg Arg Leu Pro Glu Glu Arg Thr Cys Lys Val Cys  
 545 550 555 560  
 Met Asp Lys Glu Val Ser Ile Val Phe Ile Pro Cys Gly His Leu Val  
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 Ser Thr Ile Lys Gly Thr Val Arg Thr Phe Leu Ser  
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<211> 2580

<212> DNA

<213> Homo sapiens

<220>

<221> variation

<222> (2412)...(2412)

<223> N may be any nucleotide

<400> 7

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| taattcagag  | agatactcat | cctacctgaa | tataaactga  | gataaatcca | gtaaagaaag  | 120  |
| tgtagtaa    | tctacataag | agtctatcat | tgatttcttt  | ttgtggtgga | aatcttagtt  | 180  |
| catgtgaaga  | aatttcatgt | gaatgtttta | gctatcaa    | agtagtgca  | cctactcatg  | 240  |
| cacaaaactg  | cctcccaaag | acttttccca | ggtccctcgt  | atcaaaacat | taagagtata  | 300  |
| atggaagata  | gcacgatctt | gtcagattgg | acaaacagca  | acaaacaaaa | aatgaagtat  | 360  |
| gacttttctt  | gtgaactcta | cagaatgtct | acataattcaa | ctttccccgc | cggggtgcct  | 420  |
| gtctcagaaa  | ggagtcttgc | tcgtgctggg | ttttattata  | ctggtgtgaa | tgacaaggtc  | 480  |
| aaatgcttct  | gttgtggcct | gatgctggat | aactggaaac  | taggagacag | tcctattcaa  | 540  |
| aagcataaac  | agctatatcc | tagctgtagc | tttattcaga  | atctggtttc | agctagtctg  | 600  |
| ggatccacct  | ctaagaatac | gtctccaatg | agaaacagtt  | ttgcacattc | attatctccc  | 660  |
| accttggaac  | atagtagctt | gttcagtggt | tcttactcca  | gccttcctcc | aaacctctt   | 720  |
| aattctagag  | cagttgaaga | catctcttca | tcgaggacta  | acccctacag | ttatgcaatg  | 780  |
| agtactgaag  | aagccagatt | tcttacctac | catatgtggc  | cattaacttt | tttgtcacca  | 840  |
| tcagaattgg  | caagagctgg | tttttattat | ataggacctg  | gagatagggt | agcctgcttt  | 900  |
| gcctgtggtg  | ggaagctcag | taactgggaa | ccaaaggatg  | atgctatgtc | agaacaccgg  | 960  |
| aggcattttc  | ccaactgtcc | atttttggaa | aattctctag  | aaactctgag | gttttagcatt | 1020 |
| tcaaactctga | gcatgcagac | acatgcagct | cgaatgagaa  | catttatgta | ctggccatct  | 1080 |
| agtgttccag  | ttcagcctga | gcagcttgca | agtgtctggt  | tttattatgt | gggtcgcaat  | 1140 |
| gatgatgtca  | aatgctttgg | ttgtgatggt | ggcttgaggt  | gttggaatc  | tgagatgat   | 1200 |

|             |             |            |             |            |            |      |
|-------------|-------------|------------|-------------|------------|------------|------|
| ccatgggtag  | aacatgccaa  | gtggtttcca | aggtgtgagt  | tcttgatacg | aatgaaaggc | 1260 |
| caagagtttg  | ttgatgagat  | tcaaggtaga | tatcctcatc  | ttcttgaaca | gctgttgtca | 1320 |
| acttcagata  | ccactggaga  | agaaaatgct | gacccaccaa  | ttattcattt | tggacctgga | 1380 |
| gaaagtcttt  | cagaagatgc  | tgtcatgatg | aatacacctg  | tggttaaatc | tgccttggaa | 1440 |
| atgggcttta  | atagagacct  | ggatgaaaca | acagttctaa  | gtaaaatcct | gacaactgga | 1500 |
| gagaactata  | aaacagttaa  | tgatattgtg | tcagcacttc  | ttaatgctga | agatgaaaaa | 1560 |
| agagaagagg  | agaaggaaaa  | acaagctgaa | gaaatggcat  | cagatgattt | gtcattaatt | 1620 |
| cgaagaaca   | gaatggctct  | ctttcaacaa | ttgacatgtg  | tgcttcctat | cctggataat | 1680 |
| cttttaaagg  | ccaatgtaat  | taataaacag | gaacatgata  | ttattaaaca | aaaaacacag | 1740 |
| atacctttac  | aagcgagaga  | actgattgat | accatttggg  | ttaaaggaaa | tgctgcggcc | 1800 |
| aacatcttca  | aaaactgtct  | aaaagaaatt | gactctacat  | tgtataagaa | cttatttgtg | 1860 |
| gataagaata  | tgaagtatat  | tccaacagaa | gatgtttcag  | gtctgtcact | ggaagaacaa | 1920 |
| ttgaggaggt  | tgaagtagta  | acgaacttgt | aaagtgtgta  | tggacaaaga | agtttctgtt | 1980 |
| gtattttattc | cttgtggtca  | tctggtagta | tgccagggaat | gtgccccttc | tctaagaaaa | 2040 |
| tgccctatctt | gcagggggat  | aatcaagggt | actgttcgta  | catttctctc | ttaaagaaaa | 2100 |
| atagtctata  | ttttaacctg  | cataaaaagg | tctttaaaat  | attgttgaac | acttgaagcc | 2160 |
| atctaaagta  | aaaagggaat  | tatgagtttt | tcaattagta  | acattcatgt | tctagtctgc | 2220 |
| tttggtacta  | ataatcttgt  | ttctgaaaag | atggatatcat | atatttaatc | ttaatctgtt | 2280 |
| tatttacaag  | ggaagattta  | tgtttggtga | actataattag | tatgtatgtg | tacctaaggg | 2340 |
| agtagcgctn  | ctgcttggtta | tgcatcattt | caggagttac  | tggatttggt | gttctttcag | 2400 |
| aaagctttga  | anactaaatt  | atagtgtaga | aaagaactgg  | aaaccaggaa | ctctggagtt | 2460 |
| catcagagtt  | atggtgccga  | attgtctttg | gtgcttttca  | cttgtgtttt | aaaataagga | 2520 |
| tttttctctt  | atttctcccc  | ctagtgtgtg | agaacacatc  | caataaagtg | ctttaaaaaa | 2580 |

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 <211> 618  
 <212> PRT  
 <213> Homo sapiens

<400> 8

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | His | Lys | Thr | Ala | Ser | Gln | Arg | Leu | Phe | Pro | Gly | Pro | Ser | Tyr | Gln |
| 1   |     |     |     | 5   |     |     |     | 10  |     |     |     |     | 15  |     |     |
| Asn | Ile | Lys | Ser | Ile | Met | Glu | Asp | Ser | Thr | Ile | Leu | Ser | Asp | Trp | Thr |
|     |     | 20  |     |     |     |     |     | 25  |     |     |     | 30  |     |     |     |
| Asn | Ser | Asn | Lys | Gln | Lys | Met | Lys | Tyr | Asp | Phe | Ser | Cys | Glu | Leu | Tyr |
|     |     | 35  |     |     |     |     | 40  |     |     |     | 45  |     |     |     |     |
| Arg | Met | Ser | Thr | Tyr | Ser | Thr | Phe | Pro | Ala | Gly | Val | Pro | Val | Ser | Glu |
|     | 50  |     |     |     | 55  |     |     |     |     |     | 60  |     |     |     |     |
| Arg | Ser | Leu | Ala | Arg | Ala | Gly | Phe | Tyr | Tyr | Thr | Gly | Val | Asn | Asp | Lys |
| 65  |     |     |     | 70  |     |     |     |     | 75  |     |     |     |     |     | 80  |
| Val | Lys | Cys | Phe | Cys | Cys | Gly | Leu | Met | Leu | Asp | Asn | Trp | Lys | Leu | Gly |
|     |     |     | 85  |     |     |     |     | 90  |     |     |     |     | 95  |     |     |
| Asp | Ser | Pro | Ile | Gln | Lys | His | Lys | Gln | Leu | Tyr | Pro | Ser | Cys | Ser | Phe |
|     |     | 100 |     |     |     |     |     | 105 |     |     |     | 110 |     |     |     |
| Ile | Gln | Asn | Leu | Val | Ser | Ala | Ser | Leu | Gly | Ser | Thr | Ser | Lys | Asn | Thr |
|     | 115 |     |     |     |     |     | 120 |     |     |     | 125 |     |     |     |     |
| Ser | Pro | Met | Arg | Asn | Ser | Phe | Ala | His | Ser | Leu | Ser | Pro | Thr | Leu | Glu |
|     | 130 |     |     |     |     | 135 |     |     |     |     | 140 |     |     |     |     |
| His | Ser | Ser | Leu | Phe | Ser | Gly | Ser | Tyr | Ser | Ser | Leu | Pro | Pro | Asn | Pro |
| 145 |     |     |     | 150 |     |     |     |     | 155 |     |     |     |     |     | 160 |
| Leu | Asn | Ser | Arg | Ala | Val | Glu | Asp | Ile | Ser | Ser | Ser | Arg | Thr | Asn | Pro |
|     |     |     | 165 |     |     |     |     | 170 |     |     |     |     | 175 |     |     |
| Tyr | Ser | Tyr | Ala | Met | Ser | Thr | Glu | Glu | Ala | Arg | Phe | Leu | Thr | Tyr | His |
|     |     | 180 |     |     |     |     |     | 185 |     |     |     | 190 |     |     |     |
| Met | Trp | Pro | Leu | Thr | Phe | Leu | Ser | Pro | Ser | Glu | Leu | Ala | Arg | Ala | Gly |
|     | 195 |     |     |     |     |     | 200 |     |     |     | 205 |     |     |     |     |
| Phe | Tyr | Tyr | Ile | Gly | Pro | Gly | Asp | Arg | Val | Ala | Cys | Phe | Ala | Cys | Gly |
|     | 210 |     |     |     |     | 215 |     |     |     |     | 220 |     |     |     |     |

Gly Lys Leu Ser Asn Trp Glu Pro Lys Asp Asp Ala Met Ser Glu His  
 225 230 235 240  
 Arg Arg His Phe Pro Asn Cys Pro Phe Leu Glu Asn Ser Leu Glu Thr  
 245 250 255  
 Leu Arg Phe Ser Ile Ser Asn Leu Ser Met Gln Thr His Ala Ala Arg  
 260 265 270  
 Met Arg Thr Phe Met Tyr Trp Pro Ser Ser Val Pro Val Gln Pro Glu  
 275 280 285  
 Gln Leu Ala Ser Ala Gly Phe Tyr Tyr Val Gly Arg Asn Asp Asp Val  
 290 295 300  
 Lys Cys Phe Gly Cys Asp Gly Gly Leu Arg Cys Trp Glu Ser Gly Asp  
 305 310 315 320  
 Asp Pro Trp Val Glu His Ala Lys Trp Phe Pro Arg Cys Glu Phe Leu  
 325 330 335  
 Ile Arg Met Lys Gly Gln Glu Phe Val Asp Glu Ile Gln Gly Arg Tyr  
 340 345 350  
 Pro His Leu Leu Glu Gln Leu Leu Ser Thr Ser Asp Thr Thr Gly Glu  
 355 360 365  
 Glu Asn Ala Asp Pro Pro Ile His Phe Gly Pro Gly Glu Ser Ser  
 370 375 380  
 Ser Glu Asp Ala Val Met Met Asn Thr Pro Val Val Lys Ser Ala Leu  
 385 390 395 400  
 Glu Met Gly Phe Asn Arg Asp Leu Val Lys Gln Thr Val Leu Ser Lys  
 405 410 415  
 Ile Leu Thr Thr Gly Glu Asn Tyr Lys Thr Val Asn Asp Ile Val Ser  
 420 425 430  
 Ala Leu Leu Asn Ala Glu Asp Glu Lys Arg Glu Glu Glu Lys Glu Lys  
 435 440 445  
 Gln Ala Glu Glu Met Ala Ser Asp Asp Leu Ser Leu Ile Arg Lys Asn  
 450 455 460  
 Arg Met Ala Leu Phe Gln Gln Leu Thr Cys Val Leu Pro Ile Leu Asp  
 465 470 475 480  
 Asn Leu Leu Lys Ala Asn Val Ile Asn Lys Gln Glu His Asp Ile Ile  
 485 490 495  
 Lys Gln Lys Thr Gln Ile Pro Leu Gln Ala Arg Glu Leu Ile Asp Thr  
 500 505 510  
 Ile Trp Val Lys Gly Asn Ala Ala Ala Asn Ile Phe Lys Asn Cys Leu  
 515 520 525  
 Lys Glu Ile Asp Ser Thr Leu Tyr Lys Asn Leu Phe Val Asp Lys Asn  
 530 535 540  
 Met Lys Tyr Ile Pro Thr Glu Asp Val Ser Gly Leu Ser Leu Glu Glu  
 545 550 555 560  
 Gln Leu Arg Arg Leu Gln Glu Glu Arg Thr Cys Lys Val Cys Met Asp  
 565 570 575  
 Lys Glu Val Ser Val Val Phe Ile Pro Cys Gly His Leu Val Val Cys  
 580 585 590  
 Gln Glu Cys Ala Pro Ser Leu Arg Lys Cys Pro Ile Cys Arg Gly Ile  
 595 600 605  
 Ile Lys Gly Thr Val Arg Thr Phe Leu Ser  
 610 615

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 <212> DNA  
 <213> Mus musculus

<400> 9  
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| gcggcgctta  | gtaggactg  | gagtgcttg  | cgcgaaaagg  | tggacaagtc  | ctattttcca  | 120  |
| gagaagatga  | cttttaacag | ttttgaagga | actagaactt  | ttgtacttgc  | agacaccaat  | 180  |
| aaggatgaag  | aatttgtaga | agagtttaat | agattaaaaa  | catttgctaa  | cttcccaagt  | 240  |
| agtagtcctg  | tttcagcatc | aacattggcg | cgagctgggt  | ttctttatac  | cgggtgaagga | 300  |
| gacaccgtgc  | aatgtttcag | ttgtcatgcg | gcaatagata  | gatggcagta  | tggagactca  | 360  |
| gctgttggaa  | gacacaggag | aatatcccca | aattgcagat  | ttatcaatgg  | tttttatttt  | 420  |
| gaaaatggtg  | ctgcacagtc | tacaaatcct | ggtatccaaa  | atggccagta  | caaactctgaa | 480  |
| aactgtgtgg  | gaaatagaaa | tccttttgcc | cctgacaggc  | cacctgagac  | tcatgctgat  | 540  |
| tatctcttga  | gaactggaca | ggtttagat  | atttcagaca  | ccatataccc  | gaggaaccct  | 600  |
| gccatgtgta  | gtgaagaagc | cagattgaag | tcatttcaga  | actggccgga  | ctatgctcat  | 660  |
| ttaaccccca  | gagagttagc | tagtgctggc | ctctactaca  | caggggctga  | tgatcaagtg  | 720  |
| caatgctttt  | gttggtgggg | aaaactgaaa | aattgggaac  | cctgtgatcg  | tgcttggtca  | 780  |
| gaacacagga  | caattgttcc | caattgttcc | ttgttttgg   | gccggaacgt  | taattgttca  | 840  |
| agtgaatctg  | gtgtgagttc | tgataggaat | ttcccaaatt  | caacaaactc  | tccaagaaat  | 900  |
| ccagccatgg  | cagaatatga | agcacggatc | gttacttttg  | gaacatggat  | atactcagtt  | 960  |
| aacaaggagc  | agcttgcaag | agctggattt | tatgcttttag | gtgaaggcga  | taaagtgaag  | 1020 |
| tgcttccact  | gtggaggagg | gctcacggat | tggaaagccaa | gtgaagaccc  | ctgggaccag  | 1080 |
| catgctaagt  | gctacccagg | gtgcaaatac | ctattggatg  | agaaggggca  | agaatatata  | 1140 |
| aataatattc  | atttaaccca | tccacttgag | gaatcttttg  | gaagaactgc  | tgaaaaaaca  | 1200 |
| ccaccgctaa  | ctaaaaaaat | cgatgatacc | atcttccaga  | atcctatggt  | gcaagaagct  | 1260 |
| atacgaatgg  | gatttagctt | caaggacctt | aagaaaaaaa  | tggaaagaaa  | aatccaaaca  | 1320 |
| tccgggagca  | gctatctatc | acttgaggtc | ctgattgcag  | atcttgtgag  | tgctcagaaa  | 1380 |
| gataatacgg  | aggatgagtc | aagtcaaact | tcattgcaga  | aagacattag  | tactgaagag  | 1440 |
| cagctaaggc  | gcctacaaga | ggagaagctt | tccaaaatct  | gtatggatag  | aaatattgct  | 1500 |
| atcgtttttt  | ttccttggtg | acatctggcc | acttgtaaac  | agtgtgcaga  | agcagttgac  | 1560 |
| aaatgtccca  | tgtgctacac | cgtcattacg | ttcaacccaa  | aaatttttat  | gtcttagtgg  | 1620 |
| ggcaccacat  | gttatgttct | tcttgctcta | attgaatgtg  | taatgggagc  | gaactttaag  | 1680 |
| taatcctgca  | tttgcatctc | attagcatcc | tgctgtttcc  | aaatggagac  | caatgctaac  | 1740 |
| agcactgttt  | ccgtctaaac | attcaatttc | tggatctttc  | gagttatcag  | ctgtatcatt  | 1800 |
| tagccagtgt  | tttactcgat | tgaaacctta | gacagagaag  | catttttatag | cttttcacat  | 1860 |
| gtatattggg  | agtacactga | cttgatttct | atatgtaagt  | gaattcatca  | cctgcatgtt  | 1920 |
| tcatgccttt  | tgcataagct | taacaaatgg | agtgttctgt  | ataagcatgg  | agatgtgatg  | 1980 |
| gaatctgccc  | aatgacttta | attggcttat | tgtaaacacg  | gaaagaactg  | ccccacgctg  | 2040 |
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<211> 496

<212> PRT

<213> Mus musculus

<400> 10

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| Met | Thr | Phe | Asn | Ser | Phe | Glu | Gly | Thr | Arg | Thr | Phe | Val | Leu | Ala | Asp |
| 1   |     |     |     | 5   |     |     |     | 10  |     |     |     |     |     | 15  |     |
| Thr | Asn | Lys | Asp | Glu | Glu | Phe | Val | Glu | Glu | Phe | Asn | Arg | Leu | Lys | Thr |
|     |     | 20  |     |     |     |     |     | 25  |     |     |     |     | 30  |     |     |
| Phe | Ala | Asn | Phe | Pro | Ser | Ser | Ser | Pro | Val | Ser | Ala | Ser | Thr | Leu | Ala |
|     |     | 35  |     |     |     |     | 40  |     |     |     |     | 45  |     |     |     |
| Arg | Ala | Gly | Phe | Leu | Tyr | Thr | Gly | Glu | Gly | Asp | Thr | Val | Gln | Cys | Phe |
|     |     | 50  |     |     |     | 55  |     |     |     |     | 60  |     |     |     |     |
| Ser | Cys | His | Ala | Ala | Ile | Asp | Arg | Trp | Gln | Tyr | Gly | Asp | Ser | Ala | Val |
| 65  |     |     |     |     | 70  |     |     |     |     | 75  |     |     |     | 80  |     |
| Gly | Arg | His | Arg | Arg | Ile | Ser | Pro | Asn | Cys | Arg | Phe | Ile | Asn | Gly | Phe |
|     |     |     | 85  |     |     |     |     |     | 90  |     |     |     |     | 95  |     |
| Tyr | Phe | Glu | Asn | Gly | Ala | Ala | Gln | Ser | Thr | Asn | Pro | Gly | Ile | Gln | Asn |
|     |     |     | 100 |     |     |     |     | 105 |     |     |     |     | 110 |     |     |
| Gly | Gln | Tyr | Lys | Ser | Glu | Asn | Cys | Val | Gly | Asn | Arg | Asn | Pro | Phe | Ala |
|     |     | 115 |     |     |     |     | 120 |     |     |     |     | 125 |     |     |     |
| Pro | Asp | Arg | Pro | Pro | Glu | Thr | His | Ala | Asp | Tyr | Leu | Leu | Arg | Thr | Gly |

|   |     |     |
|---|-----|-----|
| 130   | 135 | 140 |
| Gln Val Val Asp Ile Ser Asp Thr Ile Tyr Pro Arg Asn Pro Ala Met |     |     |
| 145   | 150 | 155 |
| Cys Ser Glu Glu Ala Arg Leu Lys Ser Phe Gln Asn Trp Pro Asp Tyr |     | 160 |
|   | 165 | 170 |
| Ala His Leu Thr Pro Arg Glu Leu Ala Ser Ala Gly Leu Tyr Tyr Thr |     | 175 |
|   | 180 | 185 |
| Gly Ala Asp Asp Gln Val Gln Cys Phe Cys Cys Gly Gly Lys Leu Lys |     | 190 |
|   | 195 | 200 |
| Asn Trp Glu Pro Cys Asp Arg Ala Trp Ser Glu His Arg Arg His Phe |     | 205 |
|   | 210 | 215 |
| Pro Asn Cys Phe Phe Val Leu Gly Arg Asn Val Asn Val Arg Ser Glu |     | 220 |
| 225   | 230 | 235 |
| Ser Gly Val Ser Ser Asp Arg Asn Phe Pro Asn Ser Thr Asn Ser Pro |     | 240 |
|   | 245 | 250 |
| Arg Asn Pro Ala Met Ala Glu Tyr Glu Ala Arg Ile Val Thr Phe Gly |     | 255 |
|   | 260 | 265 |
| Thr Trp Ile Tyr Ser Val Asn Lys Glu Gln Leu Ala Arg Ala Gly Phe |     | 270 |
|   | 275 | 280 |
| Tyr Ala Leu Gly Glu Gly Asp Lys Val Lys Cys Phe His Cys Gly Gly |     | 285 |
|   | 290 | 295 |
| Gly Leu Thr Asp Trp Lys Pro Ser Glu Asp Pro Trp Asp Gln His Ala |     | 300 |
| 305   | 310 | 315 |
| Lys Cys Tyr Pro Gly Cys Lys Tyr Leu Leu Asp Glu Lys Gly Gln Glu |     | 320 |
|   | 325 | 330 |
| Tyr Ile Asn Asn Ile His Leu Thr His Pro Leu Glu Glu Ser Leu Gly |     | 335 |
|   | 340 | 345 |
| Arg Thr Ala Glu Lys Thr Pro Pro Leu Thr Lys Lys Ile Asp Asp Thr |     | 350 |
|   | 355 | 360 |
| Ile Phe Gln Asn Pro Met Val Gln Glu Ala Ile Arg Met Gly Phe Ser |     | 365 |
|   | 370 | 375 |
| Phe Lys Asp Leu Lys Lys Thr Met Glu Glu Lys Ile Gln Thr Ser Gly |     | 380 |
| 385   | 390 | 395 |
| Ser Ser Tyr Leu Ser Leu Glu Val Leu Ile Ala Asp Leu Val Ser Ala |     | 400 |
|   | 405 | 410 |
| Gln Lys Asp Asn Thr Glu Asp Glu Ser Ser Gln Thr Ser Leu Gln Lys |     | 415 |
|   | 420 | 425 |
| Asp Ile Ser Thr Glu Glu Gln Leu Arg Arg Leu Gln Glu Glu Lys Leu |     | 430 |
|   | 435 | 440 |
| Ser Lys Ile Cys Met Asp Arg Asn Ile Ala Ile Val Phe Phe Pro Cys |     | 445 |
|   | 450 | 455 |
| Gly His Leu Ala Thr Cys Lys Gln Cys Ala Glu Ala Val Asp Lys Cys |     | 460 |
| 465   | 470 | 475 |
| Pro Met Cys Tyr Thr Val Ile Thr Phe Asn Gln Lys Ile Phe Met Ser |     | 480 |
|   | 485 | 490 |
|   |     | 495 |

<210> 11

<211> 67

<212> PRT

<213> Orgyia pseudotsugata

<400> 11

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| Glu Pro Ser Arg Met Ala Ala Ser Gly Phe Tyr Tyr Leu Gly Arg Gly |    |
|   | 20 |
| Asp Glu Val Arg Cys Ala Phe Cys Lys Val Glu Ile Thr Asn Trp Val |    |
|   | 35 |
|   | 40 |
|   | 45 |

Arg Gly Asp Asp Pro Glu Thr Asp His Lys Arg Trp Ala Pro Gln Cys  
 50 55 60  
 Pro Phe Val  
 65

<210> 12  
 <211> 275  
 <212> PRT  
 <213> *Cydia pomonella*

<400> 12  
 Met Ser Asp Leu Arg Leu Glu Glu Val Arg Leu Asn Thr Phe Glu Lys  
 1 5 10 15  
 Trp Pro Val Ser Phe Leu Ser Pro Glu Thr Met Ala Lys Asn Gly Phe  
 20 25 30  
 Tyr Tyr Leu Gly Arg Ser Asp Glu Val Arg Cys Ala Phe Cys Lys Val  
 35 40 45  
 Glu Ile Met Arg Trp Lys Glu Gly Glu Asp Pro Ala Ala Asp His Lys  
 50 55 60  
 Lys Trp Ala Pro Gln Cys Pro Phe Val Lys Gly Ile Asp Val Cys Gly  
 65 70 75 80  
 Ser Ile Val Thr Thr Asn Asn Ile Gln Asn Thr Thr Thr His Asp Thr  
 85 90 95  
 Ile Ile Gly Pro Ala His Pro Lys Tyr Ala His Glu Ala Ala Arg Val  
 100 105 110  
 Lys Ser Phe His Asn Trp Pro Arg Cys Met Lys Gln Arg Pro Glu Gln  
 115 120 125  
 Met Ala Asp Ala Gly Phe Phe Tyr Thr Gly Tyr Gly Asp Asn Thr Lys  
 130 135 140  
 Cys Phe Tyr Cys Asp Gly Gly Leu Lys Asp Trp Glu Pro Glu Asp Val  
 145 150 155 160  
 Pro Trp Glu Gln His Val Arg Trp Phe Asp Arg Cys Ala Tyr Val Gln  
 165 170 175  
 Leu Val Lys Gly Arg Asp Tyr Val Gln Lys Val Ile Thr Glu Ala Cys  
 180 185 190  
 Val Leu Pro Gly Glu Asn Thr Thr Val Ser Thr Ala Ala Pro Val Ser  
 195 200 205  
 Glu Pro Ile Pro Glu Thr Lys Ile Glu Lys Glu Pro Gln Val Glu Asp  
 210 215 220  
 Ser Lys Leu Cys Lys Ile Cys Tyr Val Glu Glu Cys Ile Val Cys Phe  
 225 230 235 240  
 Val Pro Cys Gly His Val Val Ala Cys Ala Lys Cys Ala Leu Ser Val  
 245 250 255  
 Asp Lys Cys Pro Met Cys Arg Lys Ile Val Thr Ser Val Leu Lys Val  
 260 265 270  
 Tyr Phe Ser  
 275

<210> 13  
 <211> 498  
 <212> PRT  
 <213> *Drosophila melanogaster*

<400> 13  
 Met Thr Glu Leu Gly Met Glu Leu Glu Ser Val Arg Leu Ala Thr Phe  
 1 5 10 15  
 Gly Glu Trp Pro Leu Asn Ala Pro Val Ser Ala Glu Asp Leu Val Ala

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |  |  |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|
|     |     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |     |     |  |  |
| Asn | Gly | Phe | Phe | Ala | Thr | Gly | Lys | Trp | Leu | Glu | Ala | Glu | Cys | His | Phe |  |  |
|     |     | 35  |     |     |     |     | 40  |     |     |     |     | 45  |     |     |     |  |  |
| Cys | His | Val | Arg | Ile | Asp | Arg | Trp | Glu | Tyr | Gly | Asp | Gln | Val | Ala | Glu |  |  |
|     |     | 50  |     |     |     | 55  |     |     |     |     | 60  |     |     |     |     |  |  |
| Arg | His | Arg | Arg | Ser | Ser | Pro | Ile | Cys | Ser | Met | Val | Leu | Ala | Pro | Asn |  |  |
| 65  |     |     |     |     | 70  |     |     |     |     | 75  |     |     |     | 80  |     |  |  |
| His | Cys | Gly | Asn | Val | Pro | Arg | Ser | Gln | Glu | Ser | Asp | Asn | Glu | Gly | Asn |  |  |
|     |     |     |     | 85  |     |     |     |     | 90  |     |     |     |     | 95  |     |  |  |
| Ser | Val | Val | Asp | Ser | Pro | Glu | Ser | Cys | Ser | Cys | Pro | Asp | Leu | Leu | Leu |  |  |
|     |     |     | 100 |     |     |     |     | 105 |     |     |     |     | 110 |     |     |  |  |
| Glu | Ala | Asn | Arg | Leu | Val | Thr | Phe | Lys | Asp | Trp | Pro | Asn | Pro | Asn | Ile |  |  |
|     |     | 115 |     |     |     |     | 120 |     |     |     |     | 125 |     |     |     |  |  |
| Thr | Pro | Gln | Ala | Leu | Ala | Lys | Ala | Gly | Phe | Tyr | Tyr | Leu | Asn | Arg | Leu |  |  |
|     |     | 130 |     |     |     | 135 |     |     |     |     | 140 |     |     |     |     |  |  |
| Asp | His | Val | Lys | Cys | Val | Trp | Cys | Asn | Gly | Val | Ile | Ala | Lys | Trp | Glu |  |  |
| 145 |     |     |     |     | 150 |     |     |     |     | 155 |     |     |     |     | 160 |  |  |
| Lys | Asn | Asp | Asn | Ala | Phe | Glu | Glu | His | Lys | Arg | Phe | Phe | Pro | Gln | Cys |  |  |
|     |     |     |     | 165 |     |     |     |     | 170 |     |     |     |     | 175 |     |  |  |
| Pro | Arg | Val | Gln | Met | Gly | Pro | Leu | Ile | Glu | Phe | Ala | Thr | Gly | Lys | Asn |  |  |
|     |     |     | 180 |     |     |     |     | 185 |     |     |     |     | 190 |     |     |  |  |
| Leu | Asp | Glu | Leu | Gly | Ile | Gln | Pro | Thr | Thr | Leu | Pro | Leu | Arg | Pro | Lys |  |  |
|     |     | 195 |     |     |     |     | 200 |     |     |     |     | 205 |     |     |     |  |  |
| Tyr | Ala | Cys | Val | Asp | Ala | Arg | Leu | Arg | Thr | Phe | Thr | Asp | Trp | Pro | Ile |  |  |
|     |     | 210 |     |     |     | 215 |     |     |     |     | 220 |     |     |     |     |  |  |
| Ser | Asn | Ile | Gln | Pro | Ala | Ser | Ala | Leu | Ala | Gln | Ala | Gly | Leu | Tyr | Tyr |  |  |
| 225 |     |     |     |     | 230 |     |     |     |     | 235 |     |     |     |     | 240 |  |  |
| Gln | Lys | Ile | Gly | Asp | Gln | Val | Arg | Cys | Phe | His | Cys | Asn | Ile | Gly | Leu |  |  |
|     |     |     |     | 245 |     |     |     |     | 250 |     |     |     | 255 |     |     |  |  |
| Arg | Ser | Trp | Gln | Lys | Glu | Asp | Glu | Pro | Trp | Phe | Glu | His | Ala | Lys | Trp |  |  |
|     |     |     | 260 |     |     |     |     | 265 |     |     |     |     | 270 |     |     |  |  |
| Ser | Pro | Lys | Cys | Gln | Phe | Val | Leu | Leu | Ala | Lys | Gly | Pro | Ala | Tyr | Val |  |  |
|     |     | 275 |     |     |     |     | 280 |     |     |     |     | 285 |     |     |     |  |  |
| Ser | Glu | Val | Leu | Ala | Thr | Thr | Ala | Ala | Asn | Ala | Ser | Ser | Gln | Pro | Ala |  |  |
|     |     | 290 |     |     |     | 295 |     |     |     |     | 300 |     |     |     |     |  |  |
| Thr | Ala | Pro | Ala | Pro | Thr | Leu | Gln | Ala | Asp | Val | Leu | Met | Asp | Glu | Ala |  |  |
| 305 |     |     |     |     | 310 |     |     |     |     | 315 |     |     |     |     | 320 |  |  |
| Pro | Ala | Lys | Glu | Ala | Leu | Thr | Leu | Gly | Ile | Asp | Gly | Gly | Val | Val | Arg |  |  |
|     |     |     |     | 325 |     |     |     |     | 330 |     |     |     |     | 335 |     |  |  |
| Asn | Ala | Ile | Gln | Arg | Lys | Leu | Leu | Ser | Ser | Gly | Cys | Ala | Phe | Ser | Thr |  |  |
|     |     |     | 340 |     |     |     |     | 345 |     |     |     |     | 350 |     |     |  |  |
| Leu | Asp | Glu | Leu | Leu | His | Asp | Ile | Phe | Asp | Asp | Ala | Gly | Ala | Gly | Ala |  |  |
|     |     | 355 |     |     |     |     | 360 |     |     |     |     | 365 |     |     |     |  |  |
| Ala | Leu | Glu | Val | Arg | Glu | Pro | Pro | Glu | Pro | Ser | Ala | Pro | Phe | Ile | Glu |  |  |
|     |     | 370 |     |     |     | 375 |     |     |     |     |     |     |     |     |     |  |  |

Leu Ser

<210> 14  
<211> 67  
<212> PRT  
<213> *Cydia pomonella*

<400> 14  
Glu Glu Val Arg Leu Asn Thr Phe Glu Lys Trp Pro Val Ser Phe Leu  
1 5 10 15  
Ser Pro Glu Thr Met Ala Lys Asn Gly Phe Tyr Tyr Leu Gly Arg Ser  
20 25 30  
Asp Glu Val Arg Cys Ala Phe Cys Lys Val Glu Ile Met Arg Trp Lys  
35 40 45  
Glu Gly Glu Asp Pro Ala Ala Asp His Lys Lys Trp Ala Pro Gln Cys  
50 55 60  
Pro Phe Val  
65

<210> 15  
<211> 67  
<212> PRT  
<213> *Drosophila melanogaster*

<400> 15  
Glu Ala Asn Arg Leu Val Thr Phe Lys Asp Trp Pro Asn Pro Asn Ile  
1 5 10 15  
Thr Pro Gln Ala Leu Ala Lys Ala Gly Phe Tyr Tyr Leu Asn Arg Leu  
20 25 30  
Asp His Val Lys Cys Val Trp Cys Asn Gly Val Ile Ala Lys Trp Glu  
35 40 45  
Lys Asn Asp Asn Ala Phe Glu Glu His Lys Arg Phe Phe Pro Gln Cys  
50 55 60  
Pro Arg Val  
65

<210> 16  
<211> 68  
<212> PRT  
<213> *Mus musculus*

<400> 16  
Glu Phe Asn Arg Leu Lys Thr Phe Ala Asn Phe Pro Ser Ser Ser Pro  
1 5 10 15  
Val Ser Ala Ser Thr Leu Ala Arg Ala Gly Phe Leu Tyr Thr Gly Glu  
20 25 30  
Gly Asp Thr Val Gln Cys Phe Ser Cys His Ala Ala Ile Asp Arg Trp  
35 40 45  
Gln Tyr Gly Asp Ser Ala Val Gly Arg His Arg Arg Ile Ser Pro Asn  
50 55 60  
Cys Arg Phe Ile  
65

<210> 17

<211> 68  
 <212> PRT  
 <213> Homo sapiens

<400> 17  
 Glu Phe Asn Arg Leu Lys Thr Phe Ala Asn Phe Pro Ser Gly Ser Pro  
 1 5 10 15  
 Val Ser Ala Ser Thr Leu Ala Arg Ala Gly Phe Leu Tyr Thr Gly Glu  
 20 25 30  
 Gly Asp Thr Val Arg Cys Phe Ser Cys His Ala Ala Val Asp Arg Trp  
 35 40 45  
 Gln Tyr Gly Asp Ser Ala Val Gly Arg His Arg Lys Val Ser Pro Asn  
 50 55 60  
 Cys Arg Phe Ile  
 65

<210> 18  
 <211> 68  
 <212> PRT  
 <213> Homo sapiens

<400> 18  
 Glu Leu Tyr Arg Met Ser Thr Tyr Ser Thr Phe Pro Ala Gly Val Pro  
 1 5 10 15  
 Val Ser Glu Arg Ser Leu Ala Arg Ala Gly Phe Tyr Tyr Thr Gly Val  
 20 25 30  
 Asn Asp Lys Val Lys Cys Phe Cys Cys Gly Leu Met Leu Asp Asn Trp  
 35 40 45  
 Lys Arg Gly Asp Ser Pro Thr Glu Lys His Lys Lys Leu Tyr Pro Ser  
 50 55 60  
 Cys Arg Phe Val  
 65

<210> 19  
 <211> 68  
 <212> PRT  
 <213> Homo sapiens

<400> 19  
 Glu Leu Tyr Arg Met Ser Thr Tyr Ser Thr Phe Pro Ala Gly Val Pro  
 1 5 10 15  
 Val Ser Glu Arg Ser Leu Ala Arg Ala Gly Phe Tyr Tyr Thr Gly Val  
 20 25 30  
 Asn Asp Lys Val Lys Cys Phe Cys Cys Gly Leu Met Leu Asp Asn Trp  
 35 40 45  
 Lys Leu Gly Asp Ser Pro Ile Gln Lys His Lys Gln Leu Tyr Pro Ser  
 50 55 60  
 Cys Ser Phe Ile  
 65

<210> 20  
 <211> 68  
 <212> PRT  
 <213> Mus musculus

<400> 20

Glu Glu Ala Arg Leu Lys Ser Phe Gln Asn Trp Pro Asp Tyr Ala His  
 1 5 10 15  
 Leu Thr Pro Arg Glu Leu Ala Ser Ala Gly Leu Tyr Tyr Thr Gly Ala  
 20 25 30  
 Asp Asp Gln Val Gln Cys Phe Cys Cys Gly Gly Lys Leu Lys Asn Trp  
 35 40 45  
 Glu Pro Cys Asp Arg Ala Trp Ser Glu His Arg Arg His Phe Pro Asn  
 50 55 60  
 Cys Phe Phe Val  
 65

<210> 21  
 <211> 68  
 <212> PRT  
 <213> Homo sapiens

<400> 21  
 Glu Glu Ala Arg Leu Lys Ser Phe Gln Asn Trp Pro Asp Tyr Ala His  
 1 5 10 15  
 Leu Thr Pro Arg Glu Leu Ala Ser Ala Gly Leu Tyr Tyr Thr Gly Ile  
 20 25 30  
 Gly Asp Gln Val Gln Cys Phe Cys Cys Gly Gly Lys Leu Lys Asn Trp  
 35 40 45  
 Glu Pro Cys Asp Arg Ala Trp Ser Glu His Arg Arg His Phe Pro Asn  
 50 55 60  
 Cys Phe Phe Val  
 65

<210> 22  
 <211> 67  
 <212> PRT  
 <213> Homo sapiens

<400> 22  
 Glu Asn Ala Arg Leu Leu Thr Phe Gln Thr Trp Pro Leu Thr Phe Leu  
 1 5 10 15  
 Ser Pro Thr Asp Leu Ala Arg Ala Gly Phe Tyr Tyr Ile Gly Pro Gly  
 20 25 30  
 Asp Arg Val Ala Cys Phe Ala Cys Gly Gly Lys Leu Ser Asn Trp Glu  
 35 40 45  
 Pro Lys Asp Asn Ala Met Ser Glu His Leu Arg His Phe Pro Lys Cys  
 50 55 60  
 Pro Phe Ile  
 65

<210> 23  
 <211> 67  
 <212> PRT  
 <213> Homo sapiens

<400> 23  
 Glu Glu Ala Arg Phe Leu Thr Tyr His Met Trp Pro Leu Thr Phe Leu  
 1 5 10 15  
 Ser Pro Ser Glu Leu Ala Arg Ala Gly Phe Tyr Tyr Ile Gly Pro Gly  
 20 25 30  
 Asp Arg Val Ala Cys Phe Ala Cys Gly Gly Lys Leu Ser Asn Trp Glu

35                      40                      45  
 Pro Lys Asp Asp Ala Met Ser Glu His Arg Arg His Phe Pro Asn Cys  
     50                      55                      60  
 Pro Phe Leu  
 65

<210> 24  
 <211> 66  
 <212> PRT  
 <213> Mus musculus

<400> 24  
 Tyr Glu Ala Arg Ile Val Thr Phe Gly Thr Trp Ile Tyr Ser Val Asn  
     1                      5                      10                      15  
 Lys Glu Gln Leu Ala Arg Ala Gly Phe Tyr Ala Leu Gly Glu Gly Asp  
             20                      25                      30  
 Lys Val Lys Cys Phe His Cys Gly Gly Gly Leu Thr Asp Trp Lys Pro  
             35                      40                      45  
 Ser Glu Asp Pro Trp Asp Gln His Ala Lys Cys Tyr Pro Gly Cys Lys  
             50                      55                      60  
 Tyr Leu  
 65

<210> 25  
 <211> 66  
 <212> PRT  
 <213> Homo sapiens

<400> 25  
 Tyr Glu Ala Arg Ile Phe Thr Phe Gly Thr Trp Ile Tyr Ser Val Asn  
     1                      5                      10                      15  
 Lys Glu Gln Leu Ala Arg Ala Gly Phe Tyr Ala Leu Gly Glu Gly Asp  
             20                      25                      30  
 Lys Val Lys Cys Phe His Cys Gly Gly Gly Leu Thr Asp Trp Lys Pro  
             35                      40                      45  
 Ser Glu Asp Pro Trp Glu Gln His Ala Lys Trp Tyr Pro Gly Cys Lys  
             50                      55                      60  
 Tyr Leu  
 65

<210> 26  
 <211> 68  
 <212> PRT  
 <213> Homo sapiens

<400> 26  
 His Ala Ala Arg Phe Lys Thr Phe Phe Asn Trp Pro Ser Ser Val Leu  
     1                      5                      10                      15  
 Val Asn Pro Glu Gln Leu Ala Ser Ala Gly Phe Tyr Tyr Val Gly Asn  
             20                      25                      30  
 Ser Asp Asp Val Lys Cys Phe Cys Cys Asp Gly Gly Leu Arg Cys Trp  
             35                      40                      45  
 Glu Ser Gly Asp Asp Pro Trp Val Gln His Ala Lys Trp Phe Pro Arg  
             50                      55                      60  
 Cys Glu Tyr Leu  
 65

<210> 27  
 <211> 68  
 <212> PRT  
 <213> Homo sapiens

<400> 27  
 His Ala Ala Arg Met Arg Thr Phe Met Tyr Trp Pro Ser Ser Val Pro  
 1 5 10 15  
 Val Gln Pro Glu Gln Leu Ala Ser Ala Gly Phe Tyr Tyr Val Gly Arg  
 20 25 30  
 Asn Asp Asp Val Lys Cys Phe Gly Cys Asp Gly Gly Leu Arg Cys Trp  
 35 40 45  
 Glu Ser Gly Asp Asp Pro Trp Val Glu His Ala Lys Trp Phe Pro Arg  
 50 55 60  
 Cys Glu Phe Leu  
 65

<210> 28  
 <211> 68  
 <212> PRT  
 <213> Orgyia pseudotsugata

<400> 28  
 Glu Ala Ala Arg Leu Arg Thr Phe Ala Glu Trp Pro Arg Gly Leu Lys  
 1 5 10 15  
 Gln Arg Pro Glu Glu Leu Ala Glu Ala Gly Phe Phe Tyr Thr Gly Gln  
 20 25 30  
 Gly Asp Lys Thr Arg Cys Phe Cys Cys Asp Gly Gly Leu Lys Asp Trp  
 35 40 45  
 Glu Pro Asp Asp Ala Pro Trp Gln Gln His Ala Arg Trp Tyr Asp Arg  
 50 55 60  
 Cys Glu Tyr Val  
 65

<210> 29  
 <211> 68  
 <212> PRT  
 <213> Cydia pomonella

<400> 29  
 Glu Ala Ala Arg Val Lys Ser Phe His Asn Trp Pro Arg Cys Met Lys  
 1 5 10 15  
 Gln Arg Pro Glu Gln Met Ala Asp Ala Gly Phe Phe Tyr Thr Gly Tyr  
 20 25 30  
 Gly Asp Asn Thr Lys Cys Phe Tyr Cys Asp Gly Gly Leu Lys Asp Trp  
 35 40 45  
 Glu Pro Glu Asp Val Pro Trp Glu Gln His Val Arg Trp Phe Asp Arg  
 50 55 60  
 Cys Ala Tyr Val  
 65

<210> 30  
 <211> 68  
 <212> PRT  
 <213> Drosophila melanogaster

<400> 30  
Val Asp Ala Arg Leu Arg Thr Phe Thr Asp Trp Pro Ile Ser Asn Ile  
1 5 10 15  
Gln Pro Ala Ser Ala Leu Ala Gln Ala Gly Leu Tyr Tyr Gln Lys Ile  
20 25 30  
Gly Asp Gln Val Arg Cys Phe His Cys Asn Ile Gly Leu Arg Ser Trp  
35 40 45  
Gln Lys Glu Asp Glu Pro Trp Phe Glu His Ala Lys Trp Ser Pro Lys  
50 55 60  
Cys Gln Phe Val  
65

<210> 31  
<211> 66  
<212> PRT  
<213> *Drosophila melanogaster*

<400> 31  
Glu Ser Val Arg Leu Ala Thr Phe Gly Glu Trp Pro Leu Asn Ala Pro  
1 5 10 15  
Val Ser Ala Glu Asp Leu Val Ala Asn Gly Phe Phe Gly Thr Trp Met  
20 25 30  
Glu Ala Glu Cys Asp Phe Cys His Val Arg Ile Asp Arg Trp Glu Tyr  
35 40 45  
Gly Asp Leu Val Ala Glu Arg His Arg Arg Ser Ser Pro Ile Cys Ser  
50 55 60  
Met Val  
65

<210> 32  
<211> 46  
<212> PRT  
<213> *Homo sapiens*

<400> 32  
Glu Gln Leu Arg Arg Leu Gln Glu Glu Arg Thr Cys Lys Val Cys Met  
1 5 10 15  
Asp Lys Glu Val Ser Val Val Phe Ile Pro Cys Gly His Leu Val Val  
20 25 30  
Cys Gln Glu Cys Ala Pro Ser Leu Arg Lys Cys Pro Ile Cys  
35 40 45

<210> 33  
<211> 46  
<212> PRT  
<213> *Homo sapiens*

<400> 33  
Glu Gln Leu Arg Arg Leu Pro Glu Glu Arg Thr Cys Lys Val Cys Met  
1 5 10 15  
Asp Lys Glu Val Ser Ile Val Phe Ile Pro Cys Gly His Leu Val Val  
20 25 30  
Cys Lys Asp Cys Ala Pro Ser Leu Arg Lys Cys Pro Ile Cys  
35 40 45

<210> 34  
 <211> 46  
 <212> PRT  
 <213> Mus musculus

<400> 34  
 Glu Gln Leu Arg Arg Leu Gln Glu Glu Lys Leu Ser Lys Ile Cys Met  
 1 5 10 15  
 Asp Arg Asn Ile Ala Ile Val Phe Phe Pro Cys Gly His Leu Ala Thr  
 20 25 30  
 Cys Lys Gln Cys Ala Glu Ala Val Asp Lys Cys Pro Met Cys  
 35 40 45

<210> 35  
 <211> 46  
 <212> PRT  
 <213> Homo sapiens

<400> 35  
 Glu Gln Leu Arg Arg Leu Gln Glu Glu Lys Leu Cys Lys Ile Cys Met  
 1 5 10 15  
 Asp Arg Asn Ile Ala Ile Val Phe Val Pro Cys Gly His Leu Val Thr  
 20 25 30  
 Cys Lys Gln Cys Ala Glu Ala Val Asp Lys Cys Pro Met Cys  
 35 40 45

<210> 36  
 <211> 46  
 <212> PRT  
 <213> Drosophila melanogaster

<400> 36  
 Glu Glu Asn Arg Gln Leu Lys Asp Ala Arg Leu Cys Lys Val Cys Leu  
 1 5 10 15  
 Asp Glu Glu Val Gly Val Val Phe Leu Pro Cys Gly His Leu Ala Thr  
 20 25 30  
 Cys Asn Gln Cys Ala Pro Ser Val Ala Asn Cys Pro Met Cys  
 35 40 45

<210> 37  
 <211> 46  
 <212> PRT  
 <213> Cydia pomonella

<400> 37  
 Glu Lys Glu Pro Gln Val Glu Asp Ser Lys Leu Cys Lys Ile Cys Tyr  
 1 5 10 15  
 Val Glu Glu Cys Ile Val Cys Phe Val Pro Cys Gly His Val Val Ala  
 20 25 30  
 Cys Ala Lys Cys Ala Leu Ser Val Asp Lys Cys Pro Met Cys  
 35 40 45

<210> 38  
 <211> 46  
 <212> PRT

<213> Orgyia pseudotsugata

<400> 38

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ala | Val | Glu | Ala | Glu | Val | Ala | Asp | Asp | Arg | Leu | Cys | Lys | Ile | Cys | Leu |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |
| Gly | Ala | Glu | Lys | Thr | Val | Cys | Phe | Val | Pro | Cys | Gly | His | Val | Val | Ala |
|     |     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |     |     |
| Cys | Gly | Lys | Cys | Ala | Ala | Gly | Val | Thr | Thr | Cys | Pro | Val | Cys |     |     |
|     |     | 35  |     |     |     |     | 40  |     |     |     |     | 45  |     |     |     |

<210> 39

<211> 2474

<212> DNA

<213> Mus musculus

<400> 39

|             |             |            |             |             |             |      |
|-------------|-------------|------------|-------------|-------------|-------------|------|
| gaattccggg  | agacctacac  | ccccggagat | cagaggtcat  | tgctggcggt  | cagagcctag  | 60   |
| gaagtgggct  | gcggtatcag  | cctagcagta | aaaccgacca  | gaagccatgc  | acaaaactac  | 120  |
| atccccagag  | aaagacttgt  | cccttcccct | ccctgtcatc  | tcacccatgaa | catggttcaa  | 180  |
| gacagcgct   | ttctagccaa  | gctgatgaag | agtgtcgaca  | cctttgagtt  | gaagtatgac  | 240  |
| ttttcctgtg  | agctgtaccg  | attgtccacg | tattcagctt  | ttcccagggg  | agttcctgtg  | 300  |
| tcagaaagga  | gtctggctcg  | tgctggcttt | tactacactg  | gtgccaatga  | caaggtcaag  | 360  |
| tgcttctgct  | gtggcctgat  | gctagacaac | tggaacaag   | gggacagtcc  | catggagaag  | 420  |
| cacagaaaagt | tgtaccccag  | ctgcaacttt | gtacagactt  | tgaatccagc  | caacagtctg  | 480  |
| gaagctagtc  | ctcggccttc  | tcttccttcc | acggcgatga  | gcacccatgcc | tttgagcttt  | 540  |
| gcaagtcttg  | agaatactgg  | ctatttcagt | ggctcttact  | cgagctttcc  | ctcagaccct  | 600  |
| gtgaacttcc  | gagcaaatca  | agattgtcct | gctttgagca  | caagtcccta  | ccactttgca  | 660  |
| atgaacacag  | agaaggccag  | attactcacc | tatgaaacat  | ggccattgtc  | ttttctgtca  | 720  |
| ccagcaaagc  | tgcccaaagc  | aggcttctac | tacataggac  | ctggagatag  | agtggcctgc  | 780  |
| tttgctgctg  | atgggaaact  | gagcaactgg | gaacgtaagg  | atgatgctat  | gtcagagcac  | 840  |
| cagaggcatt  | tccccagctg  | tccgttctta | aaagacttgg  | gtcagtctgc  | ttcgagatac  | 900  |
| actgtctcta  | acctgagcat  | gcagacacac | gcagcccgtta | ttagaacatt  | ctctaactgg  | 960  |
| ccttctagtg  | cactagttca  | ttcccaggaa | cttgcaagtg  | cgggctttta  | ttatacagga  | 1020 |
| cacagtgatg  | atgtcaagtg  | tttatgctgt | gatggtgggc  | tgaggtgctg  | ggaatctgga  | 1080 |
| gatgaccctt  | gggtggaaca  | tgccaagtgg | tttccaagggt | gtgagtactt  | gtcagaatc   | 1140 |
| aaaggccaag  | aatttgtcag  | ccaagttcaa | gctggctatc  | ctcatctact  | tgagcagcta  | 1200 |
| ttatctacgt  | cagactcccc  | agaagatgag | aatgcagacg  | cagcaatcgt  | gcattttggc  | 1260 |
| cctggagaaa  | gttcggaaga  | tgtcgtcatg | atgagcacgc  | ctgtgggttaa | agcagccttg  | 1320 |
| gaaatgggct  | tcagtaggag  | cctggtgaga | cagacggttc  | agtggcagat  | cctggccact  | 1380 |
| ggtgagaact  | acaggaccgt  | cagtgcctc  | gttataggct  | tactcgatgc  | agaagacgag  | 1440 |
| atgagagagg  | agcagatgga  | gcaggcggcc | gaggaggagg  | agtcagatga  | tctagcacta  | 1500 |
| atccggaaga  | acaaaatggg  | gcttttccaa | catttgacgt  | gtgtgacacc  | aatgctgtat  | 1560 |
| tgcttcttaa  | gtgcaagggc  | catcactgaa | caggagtgca  | atgctgtgaa  | acagaaacca  | 1620 |
| cacaccttac  | aagcaagcac  | actgattgat | actgtgttag  | caaaaggaaa  | cactgcagca  | 1680 |
| acctcattca  | gaaactccct  | tcgggaaatt | gacctgtcgt  | tatacagaga  | tataattgtg  | 1740 |
| caacaggaca  | ttaggagtct  | tcccacagat | gacattgcag  | ctctaccaat  | ggaagaacag  | 1800 |
| ttgcggcccc  | tcccgaggga  | cagaatgtgt | aaagtgtgta  | tggaaccgaga | ggtatccatc  | 1860 |
| gtgttcattc  | cctgtggcca  | tctggtcgtg | tgcaaagact  | gcgctccctc  | tctgagggaag | 1920 |
| tgtcccatct  | gtagagggac  | catcaagggc | acagtgcgca  | catttctctc  | ctgaacaaga  | 1980 |
| ctaattggtcc | atggttgcaa  | cttcagccag | gaggaagtgc  | actgtcactc  | ccagttccat  | 2040 |
| tcggaacttg  | aggtccagct  | ggatagcacg | agacaccgcc  | aaacacacaa  | atataaacat  | 2100 |
| gaaaaacttt  | tgtctgaagt  | caagaatgaa | tgaattactt  | atataataat  | tttaattggt  | 2160 |
| ttccttaaaa  | gtgctatattg | ttcccaactc | agaaaattgt  | tttctgtaaa  | catattttaca | 2220 |
| tactacctgc  | atctaaagta  | ttcatatatt | catatattca  | gatgtcatga  | gagagggttt  | 2280 |
| tgttcttgtt  | cctgaaaagc  | tggtttatca | tctgatcagc  | atatactgcg  | caacgggcag  | 2340 |
| ggctagaatc  | catgaaccaa  | gctgcaaaga | tctcacgcta  | aataaggcgg  | aaagatttgg  | 2400 |
| agaaacgaaa  | ggaaattctt  | tctgttccaa | tgtatactct  | tcagactaat  | gacctcttcc  | 2460 |
| tatcaagcct  | tcta        |            |             |             |             | 2474 |

<210> 40  
 <211> 602  
 <212> PRT  
 <213> Mus musculus

<400> 40

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Asn | Met | Val | Gln | Asp | Ser | Ala | Phe | Leu | Ala | Lys | Leu | Met | Lys | Ser |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |
| Ala | Asp | Thr | Phe | Glu | Leu | Lys | Tyr | Asp | Phe | Ser | Cys | Glu | Leu | Tyr | Arg |
|     |     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |     |     |
| Leu | Ser | Thr | Tyr | Ser | Ala | Phe | Pro | Arg | Gly | Val | Pro | Val | Ser | Glu | Arg |
|     |     | 35  |     |     |     |     | 40  |     |     |     |     | 45  |     |     |     |
| Ser | Leu | Ala | Arg | Ala | Gly | Phe | Tyr | Tyr | Thr | Gly | Ala | Asn | Asp | Lys | Val |
|     | 50  |     |     |     |     | 55  |     |     |     |     | 60  |     |     |     |     |
| Lys | Cys | Phe | Cys | Cys | Gly | Leu | Met | Leu | Asp | Asn | Trp | Lys | Gln | Gly | Asp |
| 65  |     |     |     |     | 70  |     |     |     |     | 75  |     |     |     | 80  |     |
| Ser | Pro | Met | Glu | Lys | His | Arg | Lys | Leu | Tyr | Pro | Ser | Cys | Asn | Phe | Val |
|     |     |     |     | 85  |     |     |     |     | 90  |     |     |     |     | 95  |     |
| Gln | Thr | Leu | Asn | Pro | Ala | Asn | Ser | Leu | Glu | Ala | Ser | Pro | Arg | Pro | Ser |
|     |     |     | 100 |     |     |     |     | 105 |     |     |     |     | 110 |     |     |
| Leu | Pro | Ser | Thr | Ala | Met | Ser | Thr | Met | Pro | Leu | Ser | Phe | Ala | Ser | Ser |
|     |     | 115 |     |     |     |     | 120 |     |     |     |     | 125 |     |     |     |
| Glu | Asn | Thr | Gly | Tyr | Phe | Ser | Gly | Ser | Tyr | Ser | Ser | Phe | Pro | Ser | Asp |
|     | 130 |     |     |     |     | 135 |     |     |     |     | 140 |     |     |     |     |
| Pro | Val | Asn | Phe | Arg | Ala | Asn | Gln | Asp | Cys | Pro | Ala | Leu | Ser | Thr | Ser |
| 145 |     |     |     |     | 150 |     |     |     |     | 155 |     |     |     |     | 160 |
| Pro | Tyr | His | Phe | Ala | Met | Asn | Thr | Glu | Lys | Ala | Arg | Leu | Leu | Thr | Tyr |
|     |     |     | 165 |     |     |     |     |     | 170 |     |     |     |     | 175 |     |
| Glu | Thr | Trp | Pro | Leu | Ser | Phe | Leu | Ser | Pro | Ala | Lys | Leu | Ala | Lys | Ala |
|     |     | 180 |     |     |     |     |     | 185 |     |     |     |     | 190 |     |     |
| Gly | Phe | Tyr | Tyr | Ile | Gly | Pro | Gly | Asp | Arg | Val | Ala | Cys | Phe | Ala | Cys |
|     | 195 |     |     |     |     |     | 200 |     |     |     |     | 205 |     |     |     |
| Asp | Gly | Lys | Leu | Ser | Asn | Trp | Glu | Arg | Lys | Asp | Asp | Ala | Met | Ser | Glu |
|     | 210 |     |     |     |     | 215 |     |     |     |     | 220 |     |     |     |     |
| His | Gln | Arg | His | Phe | Pro | Ser | Cys | Pro | Phe | Leu | Lys | Asp | Leu | Gly | Gln |
| 225 |     |     |     |     | 230 |     |     |     |     | 235 |     |     |     |     | 240 |
| Ser | Ala | Ser | Arg | Tyr | Thr | Val | Ser | Asn | Leu | Ser | Met | Gln | Thr | His | Ala |
|     |     |     | 245 |     |     |     |     |     | 250 |     |     |     |     | 255 |     |
| Ala | Arg | Ile | Arg | Thr | Phe | Ser | Asn | Trp | Pro | Ser | Ser | Ala | Leu | Val | His |
|     |     | 260 |     |     |     |     |     | 265 |     |     |     |     | 270 |     |     |
| Ser | Gln | Glu | Leu | Ala | Ser | Ala | Gly | Phe | Tyr | Tyr | Thr | Gly | His | Ser | Asp |
|     |     | 275 |     |     |     |     | 280 |     |     |     |     | 285 |     |     |     |
| Asp | Val | Lys | Cys | Leu | Cys | Cys | Asp | Gly | Gly | Leu | Arg | Cys | Trp | Glu | Ser |
|     | 290 |     |     |     |     | 295 |     |     |     |     | 300 |     |     |     |     |
| Gly | Asp | Asp | Pro | Trp | Val | Glu | His | Ala | Lys | Trp | Phe | Pro | Arg | Cys | Glu |
| 305 |     |     |     |     | 310 |     |     |     |     | 315 |     |     |     |     | 320 |
| Tyr | Leu | Leu | Arg | Ile | Lys | Gly | Gln | Glu | Phe | Val | Ser | Gln | Val | Gln | Ala |
|     |     |     | 325 |     |     |     |     |     | 330 |     |     |     |     | 335 |     |
| Gly | Tyr | Pro | His | Leu | Leu | Glu | Gln | Leu | Leu | Ser | Thr | Ser | Asp | Ser | Pro |
|     |     | 340 |     |     |     |     |     | 345 |     |     |     |     | 350 |     |     |
| Glu | Asp | Glu | Asn | Ala | Asp | Ala | Ala | Ile | Val | His | Phe | Gly | Pro | Gly | Glu |
|     |     | 355 |     |     |     |     | 360 |     |     |     |     | 365 |     |     |     |
| Ser | Ser | Glu | Asp | Val | Val | Met | Met | Ser | Thr | Pro | Val | Val | Lys | Ala | Ala |
|     | 370 |     |     |     |     | 375 |     |     |     |     | 380 |     |     |     |     |
| Leu | Glu | Met | Gly | Phe | Ser | Arg | Ser | Leu | Val | Arg | Gln | Thr | Val | Gln | Trp |
| 385 |     |     |     |     | 390 |     |     |     |     | 395 |     |     |     |     | 400 |
| Gln | Ile | Leu | Ala | Thr | Gly | Glu | Asn | Tyr | Arg | Thr | Val | Ser | Asp | Leu | Val |
|     |     |     | 405 |     |     |     |     |     | 410 |     |     |     |     | 415 |     |
| Ile | Gly | Leu | Leu | Asp | Ala | Glu | Asp | Glu | Met | Arg | Glu | Glu | Gln | Met | Glu |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|     |     | 420 |     |     |     |     |     | 425 |     |     |     | 430 |     |     |     |
| Gln | Ala | Ala | Glu | Glu | Glu | Glu | Ser | Asp | Asp | Leu | Ala | Leu | Ile | Arg | Lys |
|     |     | 435 |     |     |     |     | 440 |     |     |     |     | 445 |     |     |     |
| Asn | Lys | Met | Val | Leu | Phe | Gln | His | Leu | Thr | Cys | Val | Thr | Pro | Met | Leu |
|     |     | 450 |     |     |     | 455 |     |     |     |     |     | 460 |     |     |     |
| Tyr | Cys | Leu | Leu | Ser | Ala | Arg | Ala | Ile | Thr | Glu | Gln | Glu | Cys | Asn | Ala |
| 465 |     |     |     |     | 470 |     |     |     |     | 475 |     |     |     | 480 |     |
| Val | Lys | Gln | Lys | Pro | His | Thr | Leu | Gln | Ala | Ser | Thr | Leu | Ile | Asp | Thr |
|     |     |     |     | 485 |     |     |     |     | 490 |     |     |     |     | 495 |     |
| Val | Leu | Ala | Lys | Gly | Asn | Thr | Ala | Ala | Thr | Ser | Phe | Arg | Asn | Ser | Leu |
|     |     |     | 500 |     |     |     |     | 505 |     |     |     |     | 510 |     |     |
| Arg | Glu | Ile | Asp | Pro | Ala | Leu | Tyr | Arg | Asp | Ile | Phe | Val | Gln | Gln | Asp |
|     |     | 515 |     |     |     |     | 520 |     |     |     |     | 525 |     |     |     |
| Ile | Arg | Ser | Leu | Pro | Thr | Asp | Asp | Ile | Ala | Ala | Leu | Pro | Met | Glu | Glu |
| 530 |     |     |     |     |     | 535 |     |     |     |     | 540 |     |     |     |     |
| Gln | Leu | Arg | Pro | Leu | Pro | Glu | Asp | Arg | Met | Cys | Lys | Val | Cys | Met | Asp |
| 545 |     |     |     |     | 550 |     |     |     |     | 555 |     |     |     | 560 |     |
| Arg | Glu | Val | Ser | Ile | Val | Phe | Ile | Pro | Cys | Gly | His | Leu | Val | Val | Cys |
|     |     |     |     | 565 |     |     |     |     | 570 |     |     |     |     | 575 |     |
| Lys | Asp | Cys | Ala | Pro | Ser | Leu | Arg | Lys | Cys | Pro | Ile | Cys | Arg | Gly | Thr |
|     |     |     | 580 |     |     |     |     | 585 |     |     |     |     | 590 |     |     |
| Ile | Lys | Gly | Thr | Val | Arg | Thr | Phe | Leu | Ser |     |     |     |     |     |     |
|     |     | 595 |     |     |     |     | 600 |     |     |     |     |     |     |     |     |

<210> 41  
 <211> 2416  
 <212> DNA  
 <213> Mus musculus

<400> 41

|             |            |             |             |            |             |      |
|-------------|------------|-------------|-------------|------------|-------------|------|
| ctgtggtgga  | gatctattgt | ccaagtgggtg | agaaaacttca | tctggaagtt | taagcgggtca | 60   |
| gaaatactat  | tactactcat | ggacaaaact  | gtctcccaga  | gactcgcca  | aggtaccta   | 120  |
| cacccaaaaa  | cttaaacgta | taatggagaa  | gagcacaatc  | ttgtcaaatt | ggacaaagga  | 180  |
| gagcgaagaa  | aaaatgaagt | ttgacttttc  | gtgtgaactc  | taccgaatgt | ctacatatc   | 240  |
| agctttttccc | aggggagttc | ctgtctcaga  | gaggagtctg  | gctcgtgctg | gcttttatta  | 300  |
| tacaggtgtg  | aatgacaaag | tcaagtgcct  | ctgctgtggc  | ctgatgttgg | ataactggaa  | 360  |
| acaaggggac  | agtcctgttg | aaaagcacag  | acagtcttat  | cccagctgca | gctttgtaca  | 420  |
| gactctgctt  | tcagccagtc | tgcaagtctc  | atctaagaat  | atgtctcctg | tgaaaagtag  | 480  |
| atttgcacat  | tcgtcacctc | tggaacgagg  | tggcattcac  | tccaacctgt | gctctagccc  | 540  |
| tcttaattct  | agagcagtg  | aagacttctc  | atcaaggatg  | gatccctgca | gctatgccat  | 600  |
| gagtacagaa  | gaggccagat | ttcttactta  | cagtatgtgg  | cctttaagtt | ttctgtcacc  | 660  |
| agcagagctg  | gccagagctg | gcttctatta  | catagggcct  | ggagacaggg | tgccctgttt  | 720  |
| tgctgtgtgt  | gggaaactga | gcaactggga  | accaaaggat  | tatgctatgt | cagagcaccg  | 780  |
| cagacatttt  | ccccactgtc | catttctgga  | aaatacttca  | gaaacacaga | ggtttagtat  | 840  |
| atcaaactta  | agtatgcaga | cacactctgc  | tcgattgagg  | acatttctgt | actggccacc  | 900  |
| tagtgttcct  | gttcagcccc | agcagcttgc  | aagtgcctgga | ttctattacg | tggtatcgaa  | 960  |
| tgatgatgtc  | aagtgccttt | gttgatgatg  | tggcttgaga  | tggtgggaac | ctggagatga  | 1020 |
| cccctggata  | gaacacgcca | aatggtttcc  | aagggtgtgag | ttcttgatac | ggatgaaggg  | 1080 |
| tcaggagttt  | gttgatgaga | ttcaagctag  | atctcctcat  | cttcttgagc | agctgttgtc  | 1140 |
| cacttcagac  | accccgagg  | aagaaaatgc  | tgaccctaca  | gagacagtgg | tgcattttgg  | 1200 |
| ccctggagaa  | agttcgaaag | atgtcgtcat  | gatgagcacg  | cctgtgggta | aagcagcctt  | 1260 |
| ggaaatgggc  | ttcagtagga | gcctgggtgag | acagacggtt  | cagcggcaga | tcctggccac  | 1320 |
| tggtgagaa   | tacaggaccg | tcaatgatat  | tgtctcagta  | cttttgaatg | ctgaagatga  | 1380 |
| gagaagagaa  | gaggagaagg | aaagacagac  | tgaagagatg  | gcatcaggtg | acttatcact  | 1440 |
| gattcggaa   | aatagaatgg | ccctctttca  | acagttgaca  | catgtccttc | ctatcctgga  | 1500 |
| taatcttctt  | gaggccagtg | taattacaaa  | acaggaacat  | gatattatta | gacagaaaac  | 1560 |
| acagataccc  | ttacaagcaa | gagagcttat  | tgacaccgtt  | ttagtcaagg | gaaatgctgc  | 1620 |
| agccaacatc  | ttcaaaaact | ctctgaaggg  | aattgactcc  | acgttatatg | aaaacttatt  | 1680 |

|            |            |             |            |             |            |      |
|------------|------------|-------------|------------|-------------|------------|------|
| tgtggaaaag | aatatgaagt | atattccaac  | agaagacgtt | tcaggccttgt | cattggaaga | 1740 |
| gcagttgcgg | agattacaag | aagaacgaac  | ttgcaaagt  | tgtatggaca  | gagaggtttc | 1800 |
| tatttgtgtc | attccgtgtg | gtcatctagt  | agtctgccag | gaatgtgccc  | cttctctaag | 1860 |
| gaagtgtccc | atctgcaggg | ggacaatcaa  | ggggactgtg | cgcacatttc  | tctcatgagt | 1920 |
| gaagaatggt | ctgaaagtat | tgttggacat  | cagaagctgt | cagaacaaag  | aatgaactac | 1980 |
| tgatttcagc | tcttcagcag | gacattctac  | tctctttcaa | gattagtaat  | cttgctttat | 2040 |
| gaagggtagc | attgtatatt | taagcttagt  | ctgttgcaag | ggaaggtcta  | tgctgttgag | 2100 |
| ctacaggact | gtgtctgttc | cagagcagga  | gttgggatgc | ttgctgtatg  | tccttcagga | 2160 |
| cttcttgga  | tttgggaatt | tggggaaaagc | tttggaatcc | agtgatgtgg  | agctcagaaa | 2220 |
| tcctggaacc | agtgactctg | gtactcagta  | gatagggtag | cctgtacttc  | ttggtgcttt | 2280 |
| tccagtctgg | gaaataagga | ggaatctgct  | gctggtaaaa | atttgctgga  | tgtgagaaat | 2340 |
| agatgaaagt | gtttcggtg  | ggggcgtgca  | tcagtgtagt | gtgtgcaggg  | atgtatgcag | 2400 |
| gccaaacact | gtgtag     |             |            |             |            | 2416 |

<210> 42

<211> 591

<212> PRT

<213> Mus musculus

<400> 42

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Glu | Lys | Ser | Thr | Ile | Leu | Ser | Asn | Trp | Thr | Lys | Glu | Ser | Glu | Glu |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |
| Lys | Met | Lys | Phe | Asp | Phe | Ser | Cys | Glu | Leu | Tyr | Arg | Met | Ser | Thr | Tyr |
|     |     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |     |     |
| Ser | Ala | Phe | Pro | Arg | Gly | Val | Pro | Val | Ser | Glu | Arg | Ser | Leu | Ala | Arg |
|     |     | 35  |     |     |     |     | 40  |     |     |     |     | 45  |     |     |     |
| Ala | Gly | Phe | Tyr | Tyr | Thr | Gly | Val | Asn | Asp | Lys | Val | Lys | Cys | Phe | Cys |
|     | 50  |     |     |     |     | 55  |     |     |     |     | 60  |     |     |     |     |
| Cys | Gly | Leu | Met | Leu | Asp | Asn | Trp | Lys | Gln | Gly | Asp | Ser | Pro | Val | Glu |
| 65  |     |     |     |     | 70  |     |     |     |     | 75  |     |     |     |     | 80  |
| Lys | His | Arg | Gln | Phe | Tyr | Pro | Ser | Cys | Ser | Phe | Val | Gln | Thr | Leu | Leu |
|     |     |     | 85  |     |     |     |     |     | 90  |     |     |     |     | 95  |     |
| Ser | Ala | Ser | Leu | Gln | Ser | Pro | Ser | Lys | Asn | Met | Ser | Pro | Val | Lys | Ser |
|     |     |     | 100 |     |     |     |     | 105 |     |     |     |     | 110 |     |     |
| Arg | Phe | Ala | His | Ser | Ser | Pro | Leu | Glu | Arg | Gly | Gly | Ile | His | Ser | Asn |
|     |     | 115 |     |     |     |     | 120 |     |     |     |     | 125 |     |     |     |
| Leu | Cys | Ser | Ser | Pro | Leu | Asn | Ser | Arg | Ala | Val | Glu | Asp | Phe | Ser | Ser |
|     | 130 |     |     |     |     | 135 |     |     |     |     | 140 |     |     |     |     |
| Arg | Met | Asp | Pro | Cys | Ser | Tyr | Ala | Met | Ser | Thr | Glu | Glu | Ala | Arg | Phe |
| 145 |     |     |     |     | 150 |     |     |     |     | 155 |     |     |     |     | 160 |
| Leu | Thr | Tyr | Ser | Met | Trp | Pro | Leu | Ser | Phe | Leu | Ser | Pro | Ala | Glu | Leu |
|     |     |     |     | 165 |     |     |     |     | 170 |     |     |     |     | 175 |     |
| Ala | Arg | Ala | Gly | Phe | Tyr | Tyr | Ile | Gly | Pro | Gly | Asp | Arg | Val | Ala | Cys |
|     |     |     | 180 |     |     |     |     | 185 |     |     |     |     | 190 |     |     |
| Phe | Ala | Cys | Gly | Gly | Lys | Leu | Ser | Asn | Trp | Glu | Pro | Lys | Asp | Tyr | Ala |
|     | 195 |     |     |     |     |     | 200 |     |     |     |     | 205 |     |     |     |
| Met | Ser | Glu | His | Arg | Arg | His | Phe | Pro | His | Cys | Pro | Phe | Leu | Glu | Asn |
|     | 210 |     |     |     |     | 215 |     |     |     |     | 220 |     |     |     |     |
| Thr | Ser | Glu | Thr | Gln | Arg | Phe | Ser | Ile | Ser | Asn | Leu | Ser | Met | Gln | Thr |
| 225 |     |     |     |     | 230 |     |     |     |     | 235 |     |     |     |     | 240 |
| His | Ser | Ala | Arg | Leu | Arg | Thr | Phe | Leu | Tyr | Trp | Pro | Pro | Ser | Val | Pro |
|     |     |     |     | 245 |     |     |     |     | 250 |     |     |     |     | 255 |     |
| Val | Gln | Pro | Glu | Gln | Leu | Ala | Ser | Ala | Gly | Phe | Tyr | Tyr | Val | Asp | Arg |
|     |     | 260 |     |     |     |     |     | 265 |     |     |     |     | 270 |     |     |
| Asn | Asp | Asp | Val | Lys | Cys | Leu | Cys | Cys | Asp | Gly | Gly | Leu | Arg | Cys | Trp |
|     | 275 |     |     |     |     |     | 280 |     |     |     |     | 285 |     |     |     |
| Glu | Pro | Gly | Asp | Asp | Pro | Trp | Ile | Glu | His | Ala | Lys | Trp | Phe | Pro | Arg |
|     | 290 |     |     |     |     | 295 |     |     |     |     | 300 |     |     |     |     |
| Cys | Glu | Phe | Leu | Ile | Arg | Met | Lys | Gly | Gln | Glu | Phe | Val | Asp | Glu | Ile |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 305 |     |     |     |     | 310 |     |     |     |     | 315 |     |     |     |     | 320 |
| Gln | Ala | Arg | Tyr | Pro | His | Leu | Leu | Glu | Gln | Leu | Leu | Ser | Thr | Ser | Asp |
|     |     |     |     | 325 |     |     |     |     | 330 |     |     |     |     | 335 |     |
| Thr | Pro | Gly | Glu | Glu | Asn | Ala | Asp | Pro | Thr | Glu | Thr | Val | Val | His | Phe |
|     |     |     | 340 |     |     |     |     | 345 |     |     |     |     | 350 |     |     |
| Gly | Pro | Gly | Glu | Ser | Ser | Lys | Asp | Val | Val | Met | Met | Ser | Thr | Pro | Val |
|     |     | 355 |     |     |     |     | 360 |     |     |     |     | 365 |     |     |     |
| Val | Lys | Ala | Ala | Leu | Glu | Met | Gly | Phe | Ser | Arg | Ser | Leu | Val | Arg | Gln |
|     | 370 |     |     |     |     | 375 |     |     |     |     | 380 |     |     |     |     |
| Thr | Val | Gln | Arg | Gln | Ile | Leu | Ala | Thr | Gly | Glu | Asn | Tyr | Arg | Thr | Val |
| 385 |     |     |     |     | 390 |     |     |     |     | 395 |     |     |     |     | 400 |
| Asn | Asp | Ile | Val | Ser | Val | Leu | Leu | Asn | Ala | Glu | Asp | Glu | Arg | Arg | Glu |
|     |     |     |     | 405 |     |     |     |     | 410 |     |     |     |     | 415 |     |
| Glu | Glu | Lys | Glu | Arg | Gln | Thr | Glu | Glu | Met | Ala | Ser | Gly | Asp | Leu | Ser |
|     |     |     | 420 |     |     |     |     | 425 |     |     |     |     | 430 |     |     |
| Leu | Ile | Arg | Lys | Asn | Arg | Met | Ala | Leu | Phe | Gln | Gln | Leu | Thr | His | Val |
|     | 435 |     |     |     |     |     | 440 |     |     |     |     | 445 |     |     |     |
| Leu | Pro | Ile | Leu | Asp | Asn | Leu | Glu | Ala | Ser | Val | Ile | Thr | Lys | Gln |     |
|     | 450 |     |     |     |     | 455 |     |     |     | 460 |     |     |     |     |     |
| Glu | His | Asp | Ile | Ile | Arg | Gln | Lys | Thr | Gln | Ile | Pro | Leu | Gln | Ala | Arg |
| 465 |     |     |     |     | 470 |     |     |     |     | 475 |     |     |     |     | 480 |
| Glu | Leu | Ile | Asp | Thr | Val | Leu | Val | Lys | Gly | Asn | Ala | Ala | Ala | Asn | Ile |
|     |     |     |     | 485 |     |     |     |     | 490 |     |     |     |     | 495 |     |
| Phe | Lys | Asn | Ser | Leu | Lys | Gly | Ile | Asp | Ser | Thr | Leu | Tyr | Glu | Asn | Leu |
|     |     | 500 |     |     |     |     |     | 505 |     |     |     |     | 510 |     |     |
| Phe | Val | Glu | Lys | Asn | Met | Lys | Tyr | Ile | Pro | Thr | Glu | Asp | Val | Ser | Gly |
|     |     | 515 |     |     |     |     | 520 |     |     |     |     | 525 |     |     |     |
| Leu | Ser | Leu | Glu | Glu | Gln | Leu | Arg | Arg | Leu | Gln | Glu | Glu | Arg | Thr | Cys |
|     | 530 |     |     |     |     | 535 |     |     |     |     | 540 |     |     |     |     |
| Lys | Val | Cys | Met | Asp | Arg | Glu | Val | Ser | Ile | Val | Phe | Ile | Pro | Cys | Gly |
| 545 |     |     |     |     | 550 |     |     |     |     | 555 |     |     |     |     | 560 |
| His | Leu | Val | Val | Cys | Gln | Glu | Cys | Ala | Pro | Ser | Leu | Arg | Lys | Cys | Pro |
|     |     |     |     | 565 |     |     |     |     | 570 |     |     |     |     | 575 |     |
| Ile | Cys | Arg | Gly | Thr | Ile | Lys | Gly | Thr | Val | Arg | Thr | Phe | Leu | Ser |     |
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